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Vol. XXV. Part 3.

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The Journal of the Department of Agriculture of Victoria, Australia.

March, 1927.

PRINCIPAL CONTENTS

The Demand for Young Beef
The Hand-Feeding of Sheep
Bacon Pig Competition
The Care of Horses' Feet
Experimental Work with Wheat Varieties
Standard Herd Test Quarterly Report
Crop and Fallow Competitions

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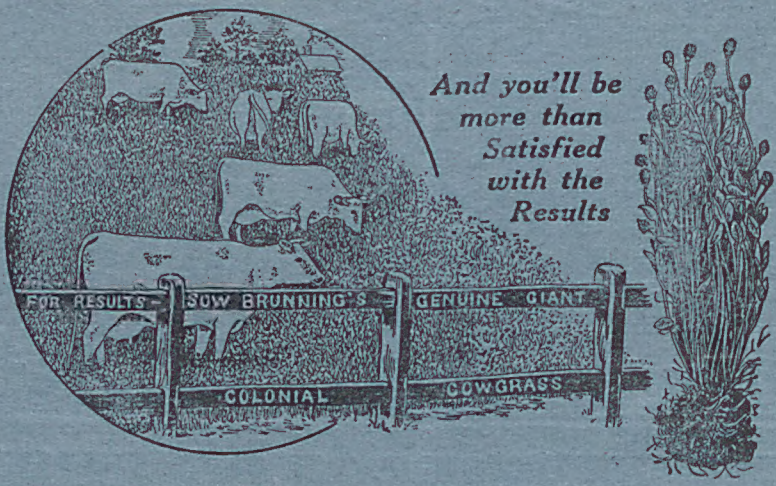

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OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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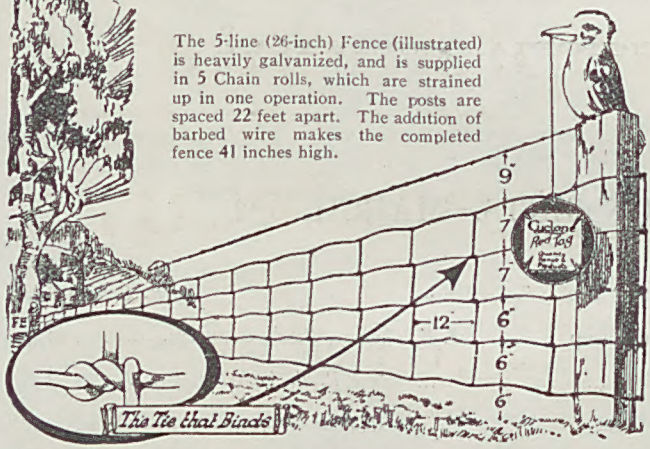

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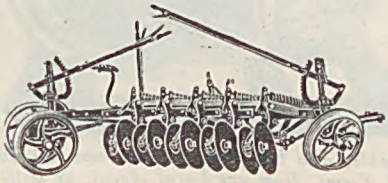

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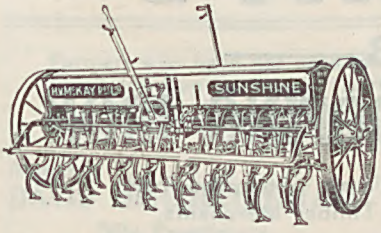

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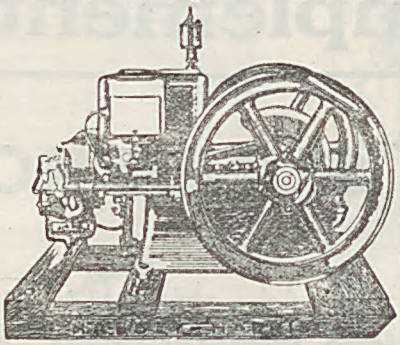

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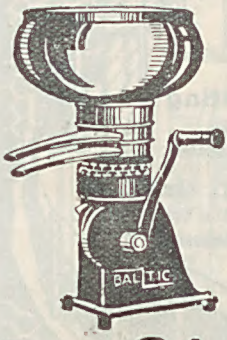

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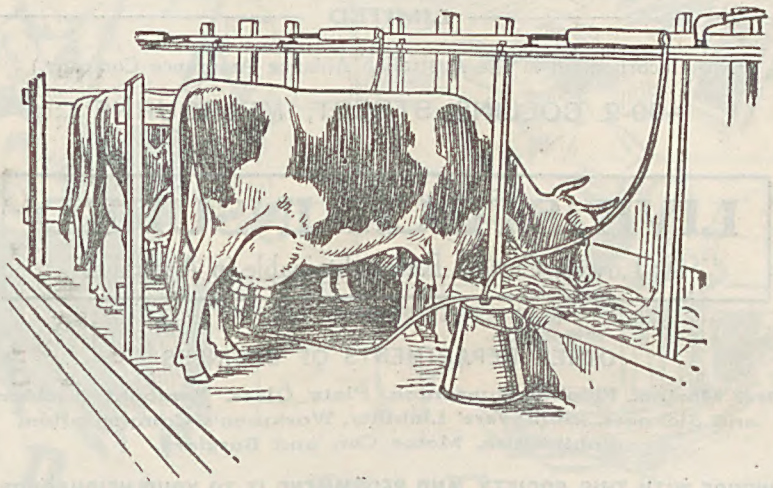

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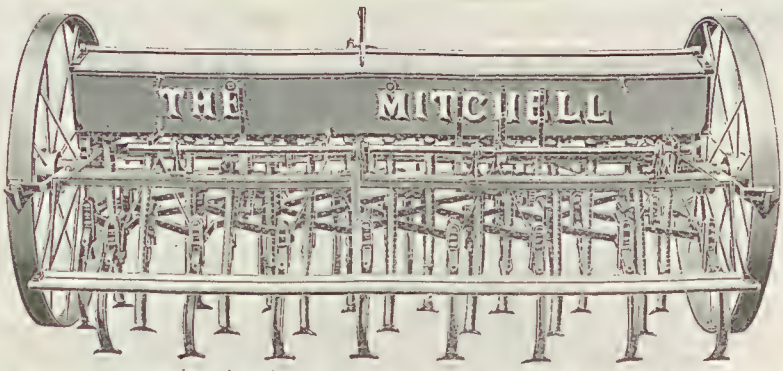

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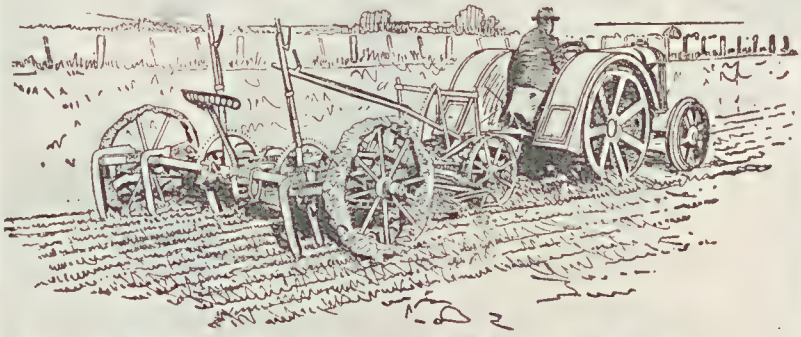

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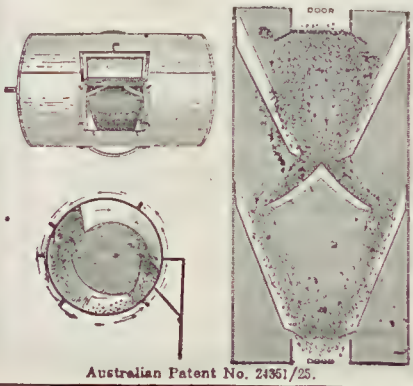

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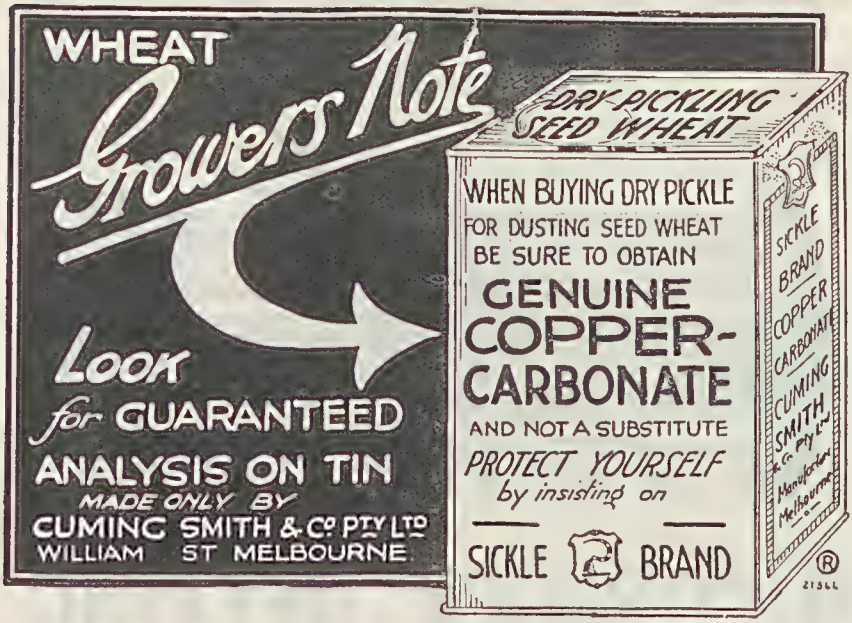

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THE JOURNAL

OF THE

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OF

VICTORIA.

Vol. XXV. March, 1927. Part 3.

THE DEMAND FOR YOUNG BEEF.

WHY STOCK-RAISERS SHOULD BREED AND FEED FOR EARLY MATURITY.

A Wireless Address by R. Crowe, Exports Superintendent, broadcast through 3LO on 2nd February, 1927.

Forecasting the Stock Market.

Markets are like the weather—very uncertain—and if any one could with a degree of accuracy forecast some time beforehand the market prices for live stock or produce, he would have no difficulty in making a fortune very rapidly.

Many years ago, the daughter of a former meteorologist in a neighbouring State was attending a social function. She was asked what her father's forecast was for the weather; she naively replied that she "never took any notice of Pa's forecast; the family was guided by Ma's corns, as they proved more reliable".

Since that time there have been changes. Following on the use of wireless, by which information is received regularly from steamers at sea and from stations all over the Commonwealth, the weather forecasts are much more reliable than formerly. A similar change has been experienced in most other countries. For instance, the people of Florida were officially warned of the recent cyclonic visitation, which did so much damage there, four days beforehand; and were advised of the time at which it would arrive, almost to the hour. This accurate and useful forecast was made possible by wireless messages from ships in various parts of the Atlantic. Unfortunately, it is not possible for the meteorologist to tell us whether an approaching disturbance with its centre at Cape Leeuwin will come in a straight line towards Melbourne, or be deflected northwards towards Brisbane or southwards towards Hobart.

As with the weather so with the markets. Indications may point to the probabilities of a shortage of produce or live stock to meet the regular consumptive demand, with consequent high prices. Rain may

come in to alter the situation, or supplies may be poured in from unexpected sources to supplement the market. For instance, large quantities of fodder had to be sent this season to the northern ports of New South Wales and Queensland. Contracts were entered into for a continuation of these supplies, but rain came at last, and the usual thing happened—all sorts of excuses are made by some buyers to avoid their obligations, whilst firms of integrity put up with their losses, which, under the circumstances, were inevitable. It is obvious they made money when the market was rising, and should have expected to lose when the rain came and the fodder was no longer needed. Reports from Queensland indicate a superabundance of rain in the coastal districts, but that the back country still needs rain. It is from the back part of Queensland that supplies have been drawn in years gone by to supplement the Melbourne market during May to August each year, and unless rain comes very soon, it would appear that there will be a scarcity of fat cattle, and prices will be high No one, however, expects such prices as obtained some years ago.

I noticed the other day that people in the back parts of Queensland, whence comes a large part of the beef supplies for Australia, were receiving chilled beef consignments by train from Brisbane. This puts me in mind of similar experiences in Victoria six or seven years ago, when graziers in the north, owning several thousands of sheep, had to buy their meat supplies in Melbourne, and have it sent up by train twice a week. People in Melbourne never think of these things. Some will consult the statistical records and take numbers alone into account; it does not follow, however, that because a man has a number of sheep or cattle, or because there are so many in the State, there is a sufficient number in a condition to provide meat for human consumption.

It is estimated that 6,000,000 or 7,000,000 sheep have been recently lost in Queensland, and it is expected that when rain comes in the areas still wanting it, supplies will be attracted from the Riverina and the northern part of Victoria, where conditions have been particularly good for re-stocking. It would, therefore, appear that the market will be good for stock-owners (especially fat stock) in Victoria in four or five months' time.

The Demand for Young Beef Increasing.

Each year the preference for young beef is becoming more pronounced in Australia, and the butcher who supplies it soon attracts customers.

The taste in England has given a lead in this respect—in the same way as with fashions in dress. Each year indicates a growing demand for best quality young beef. There was a time when prime heavy-weight bullocks were in great demand, but in recent times it has not required much mental effort to recognize that heavy-weight aged bullocks provided the cheapest beef in the market, although prices per head appeared large.

It is quite obvious, therefore, from a producer's stand-point, that the aim should be to fatten at as young an age as possible—two and a half to three years old. The cattle-raisers in the Argentina were not slow to recognize this growing tendency of the preference for young beef, and, as a matter of fact, all the chilled beef shipped from there consists of the carcasses of prime young cattle. The beef from older cattle, and beef which is not first-class, continues to be frozen, and is exported and sold as frozen beef.

Australian Chilled Beef—Why a Regular Export is not Practicable.

Much interest has been taken in the result of trial shipments of chilled beef from Australia, and for some years past proposals have been made for bringing into existence faster lines of steamers fitted specially for the conveyance of chilled beef from this country. Whilst it is hoped that efforts in this direction will prove successful, it must be recognized that suggestions for a regular trade are altogether premature.

In the Argentina, there are only a very few large freezing works, any one of which could in a short period prepare a shipment. Alfalfa (or, as we know it, lucerne) grows in abundance right up to these freezing works, and in that country they have surplus fat cattle available for slaughter regularly the year round. Unlike frozen beef, chilled beef upon its arrival at its destination, has to be marketed within a short period; whilst frozen beef may be put into store and held for consumption later on. Hence, notwithstanding the splendid organization that exists for a regular supply, when any hitch occurs, and there is a superabundance of chilled beef at any time, the market price suffers.

Some time ago an agreement existed between the Argentina freezing works to ship a regular proportion of their output weekly, so as to supply the export market uniformly. There is now trouble over this arrangement, but all the same it is believed that it will continue for some time.

Latest advices are to the effect that no improvement in the meat market in London is likely whilst the disagreement lasts. This, however, will not affect the price for beef in Victoria, as there will be little to ship from Australia on account of the adverse season in Queensland.

There is no single freezing works or port in Australia capable of preparing a full shipment of chilled beef within the time necessary to ensure success for trading on a large or commercial scale. Again, the supply from any source in Australia is purely seasonal. The freezing works in the most favoured places cannot operate the year round. Furthermore, it is usual to have supplies of fat cattle sent long distances either by rail or road, or maybe both, to the place of slaughter. Last, but not least, owing to the irregularity of the rainfall, prime young stock suitable for chilling are not available in any quantity each season.

As before stated, every one interested wishes the experimenal shipments the greatest success, but the breed of cattle will have to be improved, as well as transit conditions from pastures to freezing works, and the other disabilities overcome before an Australian export trade in chilled beef of any consequence can be successfully established.

Current Prices Show Demand for Young Beef.

The market for beef in England has undergone practically no change since November last, 4d. being the regular quotation for hindquarters, and 3½d. for crops. The term "crops" may be strange to many, and, therefore, let me explain that it means forequarters with the brisket and shin removed. For the last three weeks,* crops have been quoted at ⅛d. less, namely, 3⅜d. per lb.

* 11th–31st January, 1927.

The Melbourne market price for fat cattle during the last month* has been about 2s. 6d. per 100 lb.—or, from 15s. to £1 per head lower than it was at this time last year. At the market to-day† there were some prime pens of all ages and weights, including about six pens all the way from Bourke, New South Wales—probably brought down there some time ago from Queensland. There were a large number of a similar class of cattle from the Riverina, which were also Queensland-bred; they were five and six year old big, well-grown bullocks, but all showed the effects of long-distance travelling. These brought from £11 to £13 10s.; they would turn the scale in the neighbourhood of 850 lb. dressed weight carcass beef.

There was a prime pen of nine from Yarram, consisting of three Red Polls, three Crossbred Roans, and three crossbred Red—which would kill out at about 900 lb. of dressed carcass weight. These realized £16 12s. 6d.

An object lesson was observed in two neighbouring pens, containing in the one—five and six year old prime bullocks, weighing about 850 lb. These were sold at £13 10s. In the neighbouring pen there were nine prime Shorthorn crossbred three-year-olds, which would weigh about 700 lb., and brought the same price, namely, £13 10s.

There was a truck of Black Poll bullocks, of varying weights, from Rosedale, Gippsland, in prime condition. These brought from £13 15s. to £16 7s. 6d.

Another pen of nine three-year-old, half-bred Herefords, from Marden, Gippsland, of even weights, realized £15 7s. 6d.

There were also a couple of pens from my native district, Koroit, barely three year old, which brought £12 17s. 6d.

Prime calves, about four months' old, brought as high as £5.

These few comparative prices bear out what I have previously drawn attention to in this talk—that prime young beef is preferred; and the aim of stock-raisers should be to breed and feed for early maturity.

Many listeners-in, directly interested in the breeding and fattening of beef cattle, will be thinking, "It is all very well for this fellow in Collins-street telling us what we ought to do". You see, I am a thought reader. You can rest assured, however, that I am quite well aware of the many difficulties in the way of adopting these recommendations, the chief of which are—the class of land used, and the variation of the weather conditions in the seasons of one year as compared with those of similar times in the year immediately preceding. On many properties, it is, I know, impossible to fatten three-year-old cattle; my comments are only applicable to those districts and properties where it is possible to do so. However, if all round increased efforts be made in the direction indicated, the result will be beneficial to all concerned.

* January, 1927. † 2nd February, 1927.

THE HAND-FEEDING OF SHEEP.

By J. E. Thomas, B.Sc., B.Ag.Sc., B.V.Sc., Forage Research Officer.

Experiments with Various Foods.

In the wheat belt of Victoria there is a growing tendency for the wheat-farmer to run sheep for the help to be derived from them in the production of crops, as well as for the direct monetary return. The sheep are used to clean and compact the fallows, the ewes lambing early, and the fat lambs being sold before the grass seeds become troublesome. Necessarily, therefore, the sheep-carrying capacity is governed by the fodder resources during the dry period of the year. Though the general adoption of summer fallowing has had very beneficial effects on the wheat yield, by limiting the amount of stubble feed, it has lessened the sheep capacity of the farm.

Oat-growing has made very considerable progress in the dry areas due to better agricultural methods; in particular, the adoption of a proper system of rotation, and the use of early varieties such as Palestine and Burt's Early. Yet these methods are insufficient during a dry summer, and then reliance must be placed on stored fodders.

With, however, the gradual assurance of a good oat or hay crop by the adoption of the same principles as have so markedly increased the wheat yield, the practice of storing some fodder to feed to the flocks is becoming more frequent.

The need for hand-feeding in the dry areas is, therefore, often an annual occurrence, particularly for ewes-in-lamb, and, of course, it is an emergency method in droughty conditions, or in cases where the grass gives out, and the owner is compelled to hand-feed rather than sacrifice his flock in the sale yard.

Even in normal years, tests carried out in many centres in Victoria have shown that, on grass, sheep normally lose weight in the summer and autumn months, and in a dry period this loss is accentuated. Figures from the Newmarket yards for the years 1914 to 1926 show that the average mutton prices, exclusive of skin and offal, over this period vary from 4¾d. per lb. in December and January, to 5¼d. per lb. in February, March, and April, and thence to a maximum of 6¼d. per lb. in July.

There are, of course, extreme variations in the prices from year to year due to the vagaries of the weather and the incidence of the early rains. In prolonged dry periods the sustenance of the sheep is a problem. The water supply is now usually assured in settled areas. In regard to fodder supplies, there are two courses open—agistment or hand-feeding.

The first method eliminates the labour attached to hand-feeding, but is limited by the availability of the grass, the costs and losses incurred in transport, and the possible danger of the agisted areas being eaten out.

At the State Research Farm, a series of experiments have been carried out in order to get some information as to the actual food requirements of dry sheep, and the cost of maintaining them for lengthy periods. The need for such experiments was stressed by Mr. N. A. Bowman, the recently-appointed Sheep and Wool Expert, who, in conjunction with the writer, planned the experiments, and also took an active part in the work till such time as his other duties prevented him doing so. In periods of scanty food supply the young ewes, the nucleus of the future flock, receive the first consideration, but these experiments were commenced too late to allow the use of ewes in lamb; so, in the meanwhile, dry comeback wethers were used. Sixty wethers, rising 4-tooth, Riverina bred, and August-shorn, were ear-tagged, and divided into three lots of twenty each.

Three paddocks, each an acre in extent, were fenced off, and provided with feeding troughs and straw rack, a water supply, salt lick, and shelters.

A weighing arrangement was devised, consisting of a race leading from a crush pen to a crate, with doors at each end, fixed on a platform scales, so that all unnecessary handling was eliminated. In this work valuable suggestions were made by Mr. H. C. Wilson, Manager of the State Research Farm. The yards were thoroughly eaten down before the sheep were weighed in. The following uniform procedure was adopted in regard to weighing:—The sheep were fed at 6.30 a.m. on the day previous to weighing, and fed immediately after being weighed, on the following day, at 9 a.m.

The rations used included the fodders most commonly fed in Victoria, and were as follows:—(1) Algerian straw, alone; (2) Algerian straw and oats; (3) Algerian straw and linseed; (4) Algerian straw and lucerne hay; (5) oaten silage; (6) chaff (mixed oaten and wheaten).

Straw was always available, and was fed from racks; the other fodders were fed from troughs, daily, at 8 a.m.

As every sheep was ear-tagged, a complete record of the individual weights was obtained, and the mean figures per each pen are shown in the tables:—

Trial No. 1.—Sheep fed on Algerian Straw alone.

Dates of Weighing.	Mean Live Weight Twenty Sheep.	Average Amount Straw Consumed Per Day.
1926—	lb.	lb.
April 21	88·4	..
May 5	89·4	1·71
„ 19	86·2	1·15
June 3	84·3	1·50
„ 15	81·6	1·54
„ 29*	81·4	1·13

* One sheep died.

Trial No. 2.—Sheep fed on Straw and Linseed.

From the 29th June, the straw ration was supplemented with by a daily ration per head of linseed, as per table below:—

Date of Weighings.	Mean Live Weight Eighteen Sheep.	Linseed Nuts.	Straw.
1926—	lb.	oz.	lb.
July 9	84·3	4	1·37
,, 16	85·2	4	1·155
,, 30	84·1	4	1·20
August 11	84·7	4	1·09
,, 19	89·4	4	1·42
,, 27	90·4	3	1·44
September 3	90·8	3	1·48
,, 11	90·3	3	1·35
October 2	94·0	3	0·80
,, 14	91·6	2	1·16

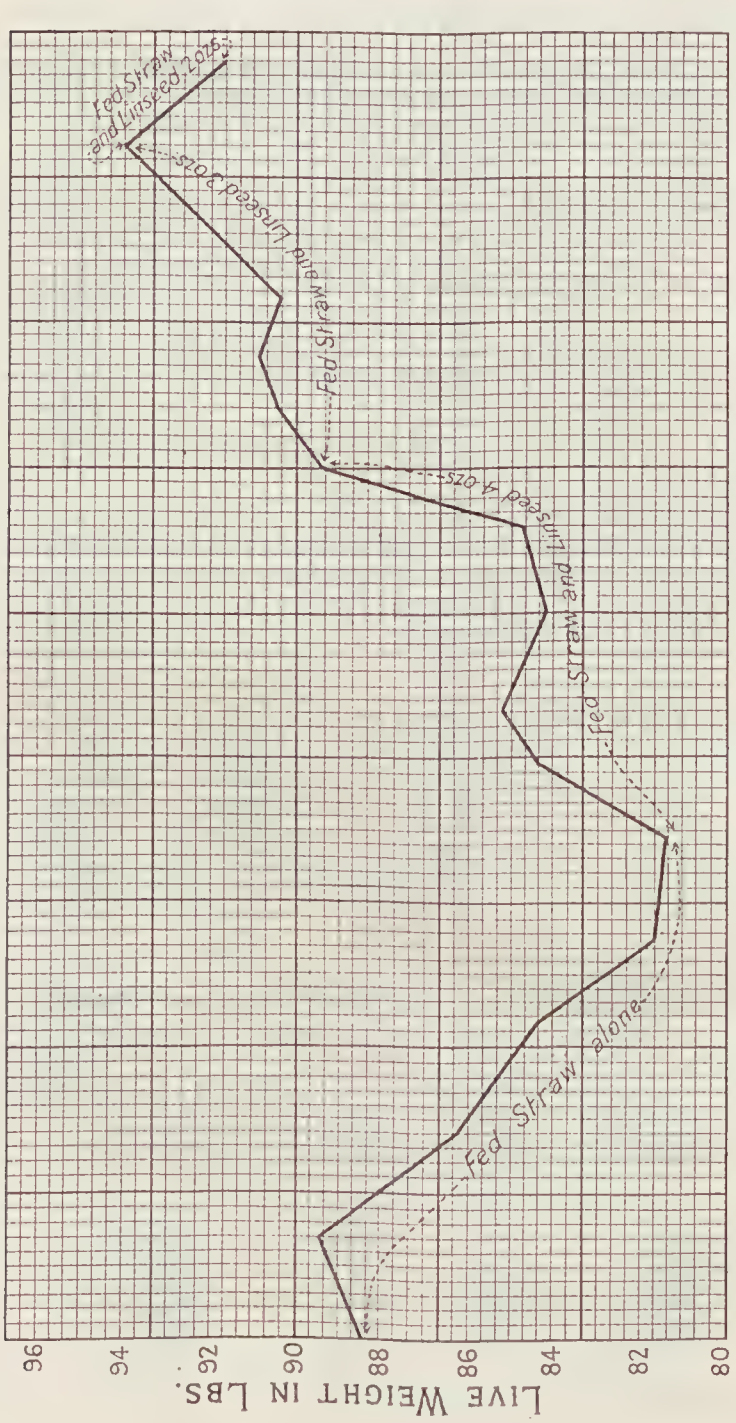
Trial No. 3.—Sheep fed on Algerian Straw and Lucerne Hay.

Date.	Average Live Weight Twenty Sheep.	Straw Per Head.	Lucerne Hay.
1926—	lb.	lb.	lb.
April 21	87·8	..	..
,, 28	91·6	1·0	0·5
May 5	91·1	·75	0·5
,, 19	88·8	·75	0·5
June 3	86·5	·72	0·5
,, 11	86·5	·98	0·5
July 2	86·7	·94	0·5
,, 9	88·9	1·18	0·5
,, 16	88·7	·97	0·5
,, 30	89·3	1·08	0·75

Trial No. 4.—Sheep fed on Chaff, Mixed Oaten and Wheaten.

On termination of Trial No. 3 the pen was fed on a chaff ration, as follows:—

Date.	Average Live Weight Twenty Sheep.	Chaff Per Head Per Day.
1926—	lb.	lb.
July 30	89·3	1·80
August 11	93·0	1·50
,, 19	91·8	1·50
,, 27	94·4	1·50
September 3	91·7	1·50
,, 11	92·2	1·50
,, 30	93·6	1·50
October 14	94·9	1·50



Graph showing loss of weight of sheep when fed on straw alone and gains and fluctuations in weight when varying amounts of linseed were added to ration.

Trial No 5.—Sheep fed on Algerian Straw and Algerian Oats uncrushed.

Date of Weighing.	Mean Weight Twenty Sheep.	Straw Consumed.	Oats Per Head.
1926—	lb.	lb.	oz.
April 21	83·1	..	..
„ 28	86·5	1·5	6
May 5	87·2	·65	6
„ 19	84·9	·70	6
June 3	82·9	·66	6
„ 15	81·6	·75	6
July 2	81·5	1·02	6
„ 9	81·6	·78	8
„ 16	81·75	·86	8
July 30*..	80·9	·68	8
August 11	81·1	·68	8

* One sheep died from natural causes.

Trial No. 6.—Sheep fed on Oaten Silage.

The pen of sheep used in the Trial No. 5 was then fed on a silage ration.

Date of Weighing.	Mean Weight Eighteen Sheep.	Silage Per Head Per Day.
1926—	lb.	lb.
August 11	81·1	..
„ 19	80·6	3·0
„ 27	82·4	2·8
September 3	81·7	3·0
„ 11	82·9	3·0
October 2	88·4	3·0
„ 14	87·2	2·0

In the above trials, there was no noticeable difference in the health of the various pens of sheep; it was uniformly good throughout, with the exception that one sheep died in the "straw alone" pen, following on faulty nutrition, and another sheep in the "straw and oats" pen died from natural causes. The pen fed lucerne and straw always looked particularly well. There were no apparent digestive troubles in the pens fed dry feeds solely.

At the end of the experiments the wool of the sheep was certainly light conditioned, and well grown and sound. After the trial, they were run on good pastures for four weeks, and were then shorn. An average cut of 10 lb. per fleece was obtained.

Conclusions from the above Tests.

Examining the data presented in the above tables, it will be seen that, in the first trial, straw alone was insufficient to maintain a dry sheep. In this particular experiment the straw used was of high quality, being dry season straw. The problem of maintenance is the supply of sufficient flesh-forming elements or protein, and it is here where straw fails. There is a fair margin in the quality of straw as indicated in the following figures:—

Algerian dry season straw used in the experiments contained 2.9 per cent. of protein; flaggy straw grown on irrigated land contains 1.9 per cent. of protein.

It is the quality of the straw that determines the quantity consumed, and the amount of supplement required for maintenance.

Of the supplements tested, linseed 3 oz. per day, lucerne ½ lb. per day, gave very satisfactory results. The graph clearly indicates the loss of weight suffered when the sheep were fed on straw only, and the gain when linseed was added to the ration. In the pen in which oats were fed, the sheep consumed considerably less straw than those in the adjoining pens. It seems from the figures that ½ lb. oats per day is scarcely sufficient, there being loss in live weight of 5 lb. per head when on an 8-oz. ration. An ample ration would be straw ad lib., and oats at the rate of 9 oz. per head per day. Lucerne hay gave very satisfactory results, and it is interesting to note that lifting the lucerne ration from ½ lb. to ¾ lb. per head per day in the last fortnight resulted in an immediate increase in live weight. The chaff ration similarly gave good results when fed at the rate of 1½ lb. per head per day. Silage also gave satisfactory results—there being a gain of 6 lb. in live weight over the experimental period where, approximately, 3 lb. of silage per day was fed. A bare maintenance ration of silage would probably be 2½ lb. per head per day.

The Composition of the Fodders Fed.

Fodder.	Moisture.	Ash.	Protein.	Crude Fat.	N-free Ext.	Crude Fibre.
	%	%	%	%	%	%
Straw, Algerian	11.41	5.94	2.95	3.45	48.87	27.38
Oats, Algerian	7.02	3.52	8.11	7.02	63.37	10.96
Lucerne hay	..	..	..	..	..	..
Linseed	10.99	5.73	29.16	10.06	35.99	8.07
"Shandy" chaff	11.62	6.77	4.23	2.80	49.76	24.83
Oaten silage	70.36	1.86	2.34	1.16	16.88	7.40

The Composition of Victorian Fodders (Averaged Figures from Departmental Analyses).

Fodder.	No. of Analysis.	Moisture.	Ash.	Protein.	Crude Fat.	N-free Ext.	Crude Fibre.
Silage—	%	%	%	%	%	%	%
Oaten	8	64.15	2.40	2.32	1.46	20.88	8.78
Barley	3	73.57	1.96	2.47	0.69	13.28	8.03
Chaffs—							
Oaten from wet districts	16	12.96	5.70	5.53	3.34	50.24	22.23
Oaten from northern districts	11	12.95	5.92	5.66	3.90	48.42	23.15
Wheaten from wet districts	9	12.66	4.92	5.93	2.63	54.39	19.47
Wheaten from northern districts	12	12.09	5.25	6.36	2.35	51.61	22.34
"Shandy" chaff ..	7	14.55	5.06	5.35	2.88	52.59	19.57
Straws—							
Wheaten	9	10.57	6.77	3.52	1.61	46.97	30.60
Oaten	8	11.11	6.12	2.00	1.76	48.76	30.25
Lucern hay	9	13.29	7.95	16.14	2.48	37.77	22.66
Oats, grain	8	11.16	3.01	10.54	5.90	60.25	9.13

From these data, it will be seen that the fodders used were fairly similar in composition to those in general use in Victoria. There were some marked differences in the protein content of the various straws and in the composition of the silage, due, in the latter case, to the stage in which the silage was. The differences are, however, not significant enough to limit the experimental conclusions, In considering the nutritive requirements of sheep, there are several factors to be considered; the live weight, wool (fine-woolled or otherwise), climatic conditions, and finally, whether the sheep are "wet" or "dry."

In general, in stating rations the food requirements are set out in terms of live weight (per 1,000 lb.), and calculations are made accordingly, i.e., a 100-lb. wether would require five-sixths the amount of a 120-lb. wether.

The effect of weather conditions is very important. These particular trials were made in a mild winter, and consequently the fodder requirement figures are higher than if the trials had been carried out in the warmer months. The figures must therefore be regarded as a maximum. The meteorological data are shown below:—

—	Average Maximum.	Minimum Temperature.	Highest Maximum.	Lowest Minimum.	Rainfall Points.
April 21–30	68·4	53·3	75·0	47·0	46
May	58·9	45·6	66·2	34·8	173
June	57·5	43·0	62·9	32·2	182
July	57·4	42·5	70·0	33·4	125
August	57·0	40·9	68·9	32·9	114
September	65·3	44·4	84·2	36·1	97
October 1–14	63·7	48·5	72·1	40·0	142

Animals, when on a maintenance ration only, are very much affected by weather conditions—particularly the temperature. This is not nearly so marked when an animal is fed liberally, since, in digesting the greater bulk of food provided, enough heat is generated to keep the body warm. On limiting the food supply, however, the amount of heat generated is correspondingly reduced, and, when the air temperature falls below a certain point, is not sufficient to keep up the body temperature, with the result that the sheep must burn up its own tissue to maintain the body heat. It will, therefore, lose weight, and to prevent such loss it is necessary to increase the ration. This is confirmed, to some extent, by the figures below, indicating the fluctuations in live weight of three pens of sheep when on a standard ration under different average minimum temperatures:—

Date.	Weight.	Mean Minimum Temperature During Period.
August 27	89·0	36·7
September 3	88·0	35·2
September 11	88·4	41·7
September 30	92·0	46·3

The temperature below which the food requirements markedly rise is termed the critical temperature, and is about 50 degrees F. It is stated* that below this point the food requirements rise at the rate of 5 per cent. for each 2 degrees F. It would seem, therefore, that the figures obtained under the conditions of the experiments at the State Research Farm are from 10 to 15 per cent. higher than if they had been carried out during the warmer months when the air temperature was much above the critical temperature.

In considering maintenance, it is not strictly correct to define a dry sheep as being non-productive. Every sheep is growing a fleece of wool, and as wool contains about 16 per cent. of nitrogen, the sole source of which is the protein in the food, it is necessary to supply an

Sheep being weighed at the State Research Farm.

adequate quantity of protein over and above the bare needs of body wear and tear.

There is a lack of definite knowledge of the requirements of ewes-in-lamb as against dry sheep, though some experimental work in Western Australia† would indicate that ewes-in-lamb can be carried in a strong healthy condition during the warm months of the year—March, April, and May—with a mean minimum temperature of 57 degrees F. on a ration supplying per 1,000 lb. live weight 0.5 lb. of crude digestible protein, with a nutritive ratio of 1-12, and a total of 10 to 15 lb. dry matter. Mr. Sutton states also that ewes can be carried in a thriving condition on 0.70 lb. digestible protein (nutritive ration 1-12) per 1,000 lb. live weight. The former amount approximates to the rations fed to dry sheep in the State Research Farm experiments, during the colder months, with an average minimum air temperature of 45.5 degrees F. For ewes

* T. B. Wood—"Animal Nutrition."
† Bulletin No. 87—"West Australian Sheep Feeding Experiments," by Sutton and Vanzetti.

the ration should not be wider than 1 to 14, and for this reason wheaten or shandy chaff alone (N.R. 1-17 to 1-19) is not in itself sufficient.

The extra demands of the ewe for additional nutrients to support the unborn lamb are not very large until close to lambing time, when the need arises for additional protein to stimulate a good milk flow. Succulent foods are then also of great benefit. Very much mortality in lambs could be avoided, and a much faster rate of growth would be obtained if the impoverished pasture at or about lambing time were supplemented by some concentrated food, so that a good milk flow might be induced

Costs of the Rations Fed in Trials at the State Research Farm.

Comeback Wethers—Live Weight 80-90 lb.

Ration.	Price.	Cost of Ration Per Day.
1. Algerian straw, 1·0 lb. ..	£3 10s. per ton ..	·92d. per day, 6½d. per week
Algerian oats, 9 oz. ..	3s. 3d. per bushel ..	
2. Algerian straw, 1·25 lb. ..	.. .. ..	·84d. ,, 6d. ,,
Lucerne hay, ·5 lb. ..	£7 5s. per ton ..	
3. Algerian straw, 1·5 lb. ..	.. .. ..	·86d. ,, 6d. ,,
Linseed nuts, 3 oz. ..	£14 per ton (2,000 lb.)	
4. Oaten silage, 2·5 lb. ..	£1 per ton ..	·28d. ,, 2d. ,,
5. Chaff (mixed oaten and wheat), 1·5 lb.	£6 10s. per ton ..	1·03d. ,, 7¼d. ,,

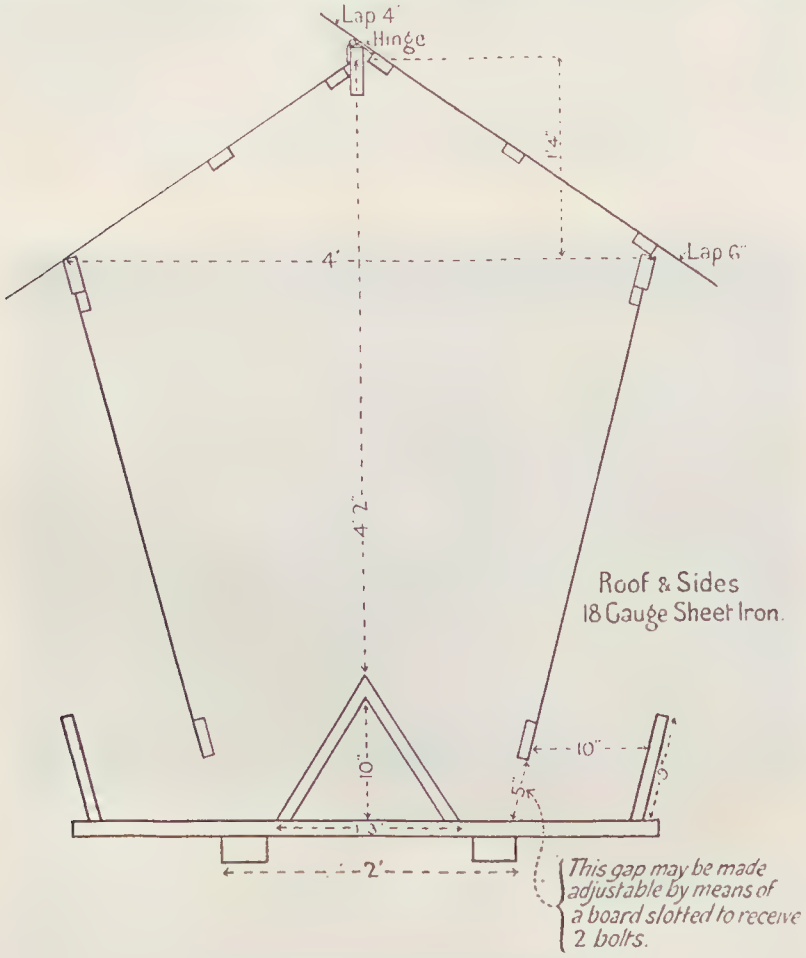
In tabulating the above rations an allowance of 15 to 20 per cent. waste in straw was made. Owing to market fluctuations, the figures are of relative value only. They may be less where the farm values of home-grown fodders are considered, or more where the landed cost includes market price, plus freight. In the case of silage, which has no market value, the production cost is taken, which at Werribee is £1 per ton for a 5-ton crop grown on fallow, and ensiled in an overhead silo.

From a perusal of these figures, it will be seen that the costs will vary considerably according as the fodders are home-grown or purchased. Taking the figures in the table alone as a basis, it is easy to compute the cost on the farm of rations made up from any of the foods mentioned.

The striking point is the low cost of feeding on silage, thus disproving the prevailing idea that the sole place of the silo is on the dairy farm. Silage may be preserved indefinitely—in fact, in the Riverina 10 to 15 year old pit silage is common. It is not only cheaply made, but also possesses the additional merits of succulence, and freedom from the ravages of mice, &c. In the rations specified in the table, roughage is supplied by the Algerian straw, and on the average farm its equivalent might be the straw stacks, the stubble, or any dry picking. These experiments show that where such roughages are available, good supplementary foods for 85-lb. wethers are linseed 3 oz., lucerne ½ lb., or oats 9 oz. The point, therefore, arises—which is the cheaper for any particular case? In Victoria, the grain most commonly used is oats, due to the fact that it is usually reasonable in price, and pays better when fed to stock that when sold as grain. There is now an increasing supply of oats, and its value as an integral part of crop rotations is being recognized. Where freight is concerned, linseed possesses many advantages, being, as it is, an extremely concentrated food containing usually 28 to 30 per cent. protein, and 8 to 10 per cent. oil. Lucerne is very valuable,

but it is always necessary to get good quality hay with a minimum amount of stalk. It is extremely palatable, and therefore there is usually little waste.

In feeding hay to sheep the problem arises—is it better to feed it as such in racks, or to chaff it? Even if properly designed racks are made, there is usually some waste, which may be up to 10 per cent. The value



Plan of Cross Section of Self-Feeder.

of this waste, however, would still be less than the cost of chaffing and bagging of hay under normal conditions. But when the price of hay begins to rise, then chaffing may be justified where there are no feeding racks. In chaffing, it is necessary to cut as short as possible for sheep.

Methods of Hand-Feeding.

Many expedients have been adopted in times of stress. In timbered country, logs may be placed about 15 or 16 inches apart, and bags tacked between. A space of 1 foot or 15 inches per sheep should be

allowed. Satisfactory bag troughs can be made by threading wire through bags placed end to end. The wires should be strained about 15 inches apart; a 6-inch sag at the bottom should be allowed. Supports about 1 foot high should be driven in every 9 feet to hold up the edges of the troughs. These troughs should be placed in a sheltered position so that they will not be blown about by the wind. A wire passed along the bottom of the trough will help to prevent this. Another wire should be strained above the middle of the trough to prevent the sheep from jumping into or across the trough.

Wooden troughs should be made about 9 in. wide at the bottom. Galvanized iron may be bent up to make satisfactory troughs.

On bare ground, linseed and grain may be broadcast with little waste, though trough feeding is desirable.

In feeding hay or straw, racks are necessary to reduce waste. Wire netting (2½-inch mesh) is useful for making racks. In constructing wooden racks, there are two principles to be considered—firstly, they should be fairly straight-sided, so that straw, &c., will not fall down into the wool; secondly, they should have a fair capacity so as to cut down the labour involved. A suitable size is one 6 feet high, 2 feet 6 inches wide at the bottom on the ground, and 7 feet wide over all at the top. The rack slats 3 inches by 1 inch can be spaced from 5 to 6 inches apart.

Unquestionably the ideal method of feeding chaff to sheep is by means of the self-feeder. With it there is practically no waste; the weaker sheep fare better, and the labour is reduced to a minimum.

In constructing self-feeders, there are several principles to be observed:—(1) A self-feeder should be of ample capacity to ensure that the labour of filling is reduced to a minimum; (2) the roof should project over the trough to keep the rain off, and so ensure that the chaff will not be blocked by the wet; (3) the feeder must be placed in a sheltered position so that the wind will not whirl out the chaff. To avoid this latter loss, which may be a very serious one, it is advisable to extend the ends of the feeder past the troughs, and so keep the wind out. Self-feeders are not fool-proof, and it is always advisable to make daily inspections to see that the feed is running freely. On page 142 there is reproduced an out-line of the type of self-feeder in common use. A feeder about 8 feet long, built on these lines, would hold about 10 cwt. of chaff.

Principles of Hand-Feeding.

1. Duration of Hand-Feeding.

It is essential to commence hand-feeding early, to carry it out thoroughly, and not to terminate it for some time after the grass has got a good start. The reason for giving the grass a start is the fact that immature grass is very watery, and contains little nourishment, and is liable to bring on digestive troubles.

Hand-feeding should never be delayed until the sheep begin to lose condition. If condition be lost, and the sheep be put on unusual foods, there may be serious losses owing to the weakening of the constitution, and the consequent inability of the digestive organs to assimilate the unaccustomed foods.

2. Ample Water Necessary.

It is always necessary to have ample water close at hand when feeding on dry foods, for long trips for water are very weakening. At times in parts of Victoria where the water obtained from bores is highly mineralized, the amount of salt in it may be excessive, and lead to kidney troubles due to the formation of calculi. Though the exact tolerance of sheep for the different salts in the water supply is not definitely known, observations made by the chemist's branch of the Department of Agriculture would indicate that water containing up to 300 to 400 parts salt per 100,000 is quite suitable; water containing from 400 to 1,000 parts should be used for short periods only, and water with more than 1,000 parts per 100,000 should not be used at all, except perhaps only for very short periods in cases of dire necessity. The latter strength corresponds to about 1½ oz. of salt per gallon of water.

3. Supply of Salt Necessary.

The supply of plenty of salt is also necessary. In the experiments conducted at the State Research Farm, the average amount consumed per day per sheep was 0.19 oz., or approximately 1.33 oz. per head per week, or, roughly, 4½ lb. of salt per year. Of course, these figures might not hold in the case of sheep on natural pastures. For wet sheep, it has been found that the salt requirements are considerably greater.

In New South Wales, where scrub is cut for emergency feeding, a laxative lick containing 5 to 10 per cent. of Epsom salts is recommended.

4. Some Variety of Foods Necessary.

When feeding for lengthy periods, it is found that mixed foods give better results than are obtained from the prolonged use of single foods. With mixed foods the ratio is better balanced, and they have a greater palatability. With a variety of fodders, there is always less danger of the sheep "going off" their food. In New South Wales, however, when lucerne hay was fed at the rate of 3 lb. per day to 85-lb. merino wethers, it was found that, on this ration, they could be maintained for a year without any ill effects, though much better results were obtained with a ration of lucerne and maize.* Owing in part to its greenness, lucerne hay is very palatable, and this, coupled with the fact that it was fed liberally, gives the probable explanation.

Mixing foods also supplies some balance between the bulkier and the more concentrated foods. The roughages are necessary to give enough ballast for the digestive organs to function properly, whereas the grains and other concentrated foods supply the greater bulk of the nutriment. Foods which are unpalatable, such as straws, hay, &c., may often be fed when mixed with a little molasses. Bales of straw have been soaked in a tank containing a solution of molasses and water, and fed with good results. Chaff, &c., can be damped in a solution of molasses broken down with from 5 to 6 parts of hot water.

5. Feed in Small Flocks.

It is always found, when feeding, that the strong sheep get in first, and the weaker are pushed to the rear. It is, therefore, advisable to have plenty of troughing accommodation. If the fodders are broadcast, it is essential to feed in small mobs; then the weaker sheep can be separated and fed together.

* *Agricultural Gazette* of New South Wales, November, 1926.

BACON PIG COMPETITIONS.*

AT THE ROYAL AGRICULTURAL SHOW, 1926.

By R. T. Archer, Senior Dairy Inspector, and A. J. Gill, Senior Herd Tester.

At the last Royal Agricultural Show prizes were offered for the best two pure-bred baconers between 180 and 220 lb. live weight (Class 452), and for the best two pure-bred porkers between 90 and 135 lb. live weight (Class 453). The conditions governing the competitions read as follow:—

> Sows are eligible for entry in this class.
>
> Pigs to be weighed previous to judging, and these weights, together with dates of farrowing, will be displayed on pens during the Show.
>
> All exhibits must be from litters notified in accordance with the rules of the Australian Stud Pig Breeders' Society. A maximum of 50 points will be awarded by the judge whilst the pigs are alive, after which they will be slaughtered under supervision of the judge at a bacon factory, and a maximum of 50 points will be awarded after the slaughter. A detailed account will be kept and published of the live and dressed weight of each exhibit, together with all particulars of weight of offal, appearance and quality of carcass, and value per lb. at ruling rates.
>
> The prizes will be awarded to the exhibits that gain the most points in the two judgings, and will be the property of the exhibitors.

For the baconers (between 180 and 220 lb.) there were thirteen entries, including three Berkshires, two Middle Yorkshires, one Tamworth, three Gloucester Old Spots, one British Black, and three Large Yorkshires. One entry of Large Yorkshires was withdrawn, as well as the entry of Large British Blacks and another of Berkshires. The Tamworths and two entries of Gloucester Old Spots (Nos. 2629 and 2630) exceeded the weight-limit fixed. On pages 146-148 will be found figures of the live weight and the carcass weight, &c.

For the prize for the two pure-bred porkers (between 90 and 135 lb. live weight) there were two entries of Middle Yorkshires and one of Berkshire. One entry of Middle Yorkshires proved in excess of the maximum weight allowed. The first prize was awarded to the other pair of Middle Yorkshires. In allotting points, the judge allowed the maximum less half a point to this pair when judging them as live pigs, and he awarded the maximum number of points for the carcasses.

The second prize was given to the Berkshires with a total number of 78 points.

The details of points allotted are given on page 149.

* In the Bacon Pig Competitions at the last Royal Agricultural Show Messrs. Archer and Gill acted as Stewards. A report on the Competitions was submitted by them to the Royal Agricultural Society, and (with some additions) it is printed here with the consent of the Society.

Statement showing Average Value of Each Carcass (Baconers between 180 and 220 lb. weight).

Number	2625.	2626.	2627.	2632.	2633.	2635.	2636.
Breed	Middle York.	Berkshire.	Gloucester Old Spots.	Middle York.	Berkshire.	Large York.	Large York.
Weight and Value—							
Shoulder, at 8d. per lb.	35¼ lb. £1 3 6	37½ lb. £1 4 10	34¼ lb. £1 3 2	34¾ lb. £1 3 2	38½ lb. £1 5 8	37¼ lb. £1 4 10	36 lb. £1 4 0
Middle, at 1s. 1d. per lb.	56¾ lb. £3 1 6	58¼ lb. £3 3 1	47½ lb. £2 11 5	54½ lb. £2 19 0	59½ lb. £3 4 5	52½ lb. £2 16 7	53½ lb. £2 17 8
Ham at 1s. 1d. per lb.	44¾ lb. £2 8 6	43 lb. £2 6 7	42½ lb. £2 6 0	45½ lb. £2 9 3	44½ lb. £2 8 2	47 lb. £2 10 11	48¾ lb. £2 12 10
Total Value	£6 13 6	£6 14 6	£6 0 7	£6 11 5	£6 18 3	£6 12 4	£6 14 6
Length of side	Inches. 36½	Inches. 48	Inches. 47	Inches. 47½	Inches. 47½	Inches. 48½	Inches. 52
Thickness of fat	1¾ to 2¼	1½ to 2½	1½ to 2¼	1⅜ to 2¼	1¼ to 2⅜	¾ to 1½	1 to 1½
Round the ham	26½	26	25	26½	27½	27	27¼

Statement showing Points Allotted to Each Competitor (Baconers between 180 and 220 lb. weight).

Exhibit Number		2625.	2626.	2627.	2632.	2633.	2635.	2636.
Breed		Middle York.	Berkshire.	Gloucester Old Spots.	Middle York.	Berkshire.	Large York.	Large York.
Farrowed		25th Jan., 1926.	10th March, 1926.	1st March, 1926.	12th March, 1926.	5th April, 1926.	6th April, 1926.	6th April, 1926.
Age: days since birth		234.	190.	199.	188.	164.	163.	163.
Points awarded alive—	Maximum							
Type: Correct conformation	16	12	14	Nil	10	16	7	9
Weight gained for age	15	10·1	11·7	11·5	12·7	14	15	14·8
Length and depth	11	7	6	5	6	8	5	7
Quality: Fineness of skin and bone	8	7	8	5	5	8	3	5
TOTAL	50	36·1	39·7	21·5	33·7	46	30	35·8
Points awarded to carcass—								
Correct shape	9	9	8	5	7	9	5	5
Quality	9	9	9	5	7	8	5	5
Correct thickness of fat	8	6	6	6·5	8	8	6	6
Shoulder, neck, and head	5	5	4·6	4	4	4·5	4	4
Middle	6	3	5	3	4	6	3	3
Ham	5	3	4	2·5	3	5	2·5	2·5
Loss in offal	5	4	5	2·5	4·5	4·5	3	3
Skin and bone (fineness)	3	3	3	2	3	3	2	2
TOTAL	50	42	44·5	30·5	40·5	48	30·5	30·5
GRAND TOTAL	100	84·2	84·2	52·0	74·2	94	60·5	66·3

Statement showing Daily Increase in Weight, Live Weight, &c. (Baconers between 180 and 220 lb. weight).

No.	Breed.	Owner.	Lb. Live Weight, 16.9.26.	Average.	Days since Birth.	Increase per day lb. Live Weight.	Live Weight. 21.9.26.	Carcass Weight. lb.		Sides. lb.		Per cent. Loss.
2625	Middle York ..	Thorburn, J. H. ..	216 198	207	234	0·884	210 195	169 155	324	137¾ 136¾	274½	15·28
2626	Berkshire	Bedwell, G. A. ..	200½ 188	194¼	190	1·022	203 193	167 157	324	138 138½	276½	14·67
2627	Gloucester Old Spots	Tucker, C.	203 196	199½	199	1·002	211 198	154 146	300	124¾ 124	284¾	17·09
2632	Middle York ..	Joyce, R.	214 204	207	188	1·111	200 199	159 158	317	134¾ 133½	268¼	15·38
2633	Berkshire	Lennie, Mrs. R. ..	203½ 198	200¾	164	1·224	205 202	169 165	334	142½ 138¼	280½	16·12
2635	Large York ..	Harvey, T. ..	220 205½	212¾	163	1·305	219 207	165 160	325	136½ 133¾	270¼	17·16
2636	Large York	Harvey, T. ..	213 208	210½	163	1·291	214 211	165 164	329	139 138	277	15·81
2629	Gloucester Old Spots	Russell and Johnson..	252 241	246½	244	1·010	247 238	194 191	385			
2630	Gloucester Old Spots	Russell and Johnson..	254 243	248½	217	1·145	250 243	197 193	390			
2634	Tamworth	Butler, G. J. ..	228 222	225¼	166	1·355	230 227	190 185	375			

Statement of points allotted to Competitors in Class for Porkers (between 90 and 135 lb. weight.

Exhibit Number		2637.	2640.
Breed		Middle York.	Berkshire.
Farrowed		26th May, 1926	22nd May, 1926.
Points awarded live pig—	Maximum.		
Type: correct conformation	16	16	13
Weight gained for age	15	14.5	15
Length and depth	11	11	9
Quality: fineness of skin and bone	8	8	6
Total points awarded to live pigs	50	49.5	43
Points awarded for carcasses—			
Shape	12	12	10
Quality	15	15	12
Correct proportion of fat to lean	15	15	11
Loss in offal	8	8	2
Total points awarded for case	50	50	35
Grand Total	100	99.5	78

Remarks on the Competition.

This competition is unique in the history of the pig industry in Victoria, and, we believe, in Australia; and, as interest in it increases, it is likely to prove one of the most important and instructive competitions in the live stock sections of the Show.

Very much the same type of pig is required for the local trade as for the English market, except that in England a slightly heavier pig will be taken than is acceptable in this country. Owing to our comparatively small population, the demand for bacon in Australia is limited; yet, so far as can be ascertained, curers have a difficulty in obtaining an adequate supply of pigs suitable for a first class trade.

Last year, Great Britain imported pig products to the value of £69,000,000. Therefore, we have a market that should be exploited. If we proceed on right lines and send the right class of meat, the price will be remunerative. This competition should act as a guide for future action.

Being the first competition of its kind in Australia, naturally some improvements in the method of judging may be suggested. For instance, it is not fair to either judge or exhibitors that the same judge should adjudicate on the live pigs and afterwards on the carcass. In any competitions of the kind on the other side of the world separate judges are appointed. It would also be possible to carry the competition a stage further, and have the sides cured and a joint cooked to determine the quality of the meat. This is done at the testing stations in Denmark, and has very materially assisted in the development of their bacon export trade.

Experience gained in this competition will enable breeders to time the date of birth, so that they may have their entries "finished" within the weight limit, and thus they will not suffer the disappointment of having them disqualified on account of overweight. And if, in order to keep an animal down in weight, his growth is checked in any way, there is bound to be some deterioration in quality.

The competition will also be an incentive to the installation of scales. Experience would indicate that scales are just as essential in testing the meat-producing capacity of pigs as they are in testing the milk and butter-fat producing capacity of cows.

It would be advisable to have suitable scales installed at the Show Ground, with a platform and crate or frame, conveniently situated, so that pigs of various kinds could be weighed. This should be the means of obtaining some valuable information with regard to weight of individual pigs, litters, &c.

In studying the conformation of the sides of bacon in the competition, an outstanding fault in several of the pigs was an excessive thickness of fat. From an export point of view, this is of great importance.

The standard laid down in England for Grade A bacon is that a pig weighing from 140 to 170 lb. dead weight shall not yield more than 1½-in. thickness of back fat. It will be noted that five out of seven of the exhibits exceeded 2 inches of back fat. This would have placed them in a lower class.

It is generally understood that up to the present time no one strain of pure-bred pigs has been found capable of producing the perfect bacon animal; and, so far, the best results have been obtained from cross-bred pigs.

However, there is no reason why progressive breeders should not try to evolve the perfect type from pure-bred animals. To do this it would be necessary for breeders to set aside pigs from the different litters, and fatten them. The carcasses would have to be reported on by bacon-curers, in order that defects might be indicated, and the breeders' task then would be to see that in future litters these faults were eliminated as far as possible. This, of course, would be the work of some years, and, in the meantime, we would have to rely on the cross bred pig for first class bacon. If, therefore, a prize were offered for a cross-bred baconer, it would be of value to the industry, for in this way the value of different breeds for crossing purposes could be indicated.

Suggested Regulations for Competitions.

We believe that the adoption of the following suggestions would tend to make the judging of bacon pigs easier, and also make the competition of more value to pig-farmers:—

1. The appointment of two judges, one for the live pigs and one for the carcasses.
2. The curing of the sides of the winning pigs and the display of the bacon at the following Show.
3. The installation of suitable scales and the setting aside of a pen at the pig pavilion for the purpose of weighing pigs.
4. Pigs competing in bacon and pork classes to be marked, when weighed, with numbered tag in ear.
5. All pigs to be weighed on the same scale before being sent away for slaughter, so that the quantity of offal in each case may be ascertained.
6. All pigs to be removed to the slaughter-yards in crates, so that they may be kept from fighting and so becoming heated.

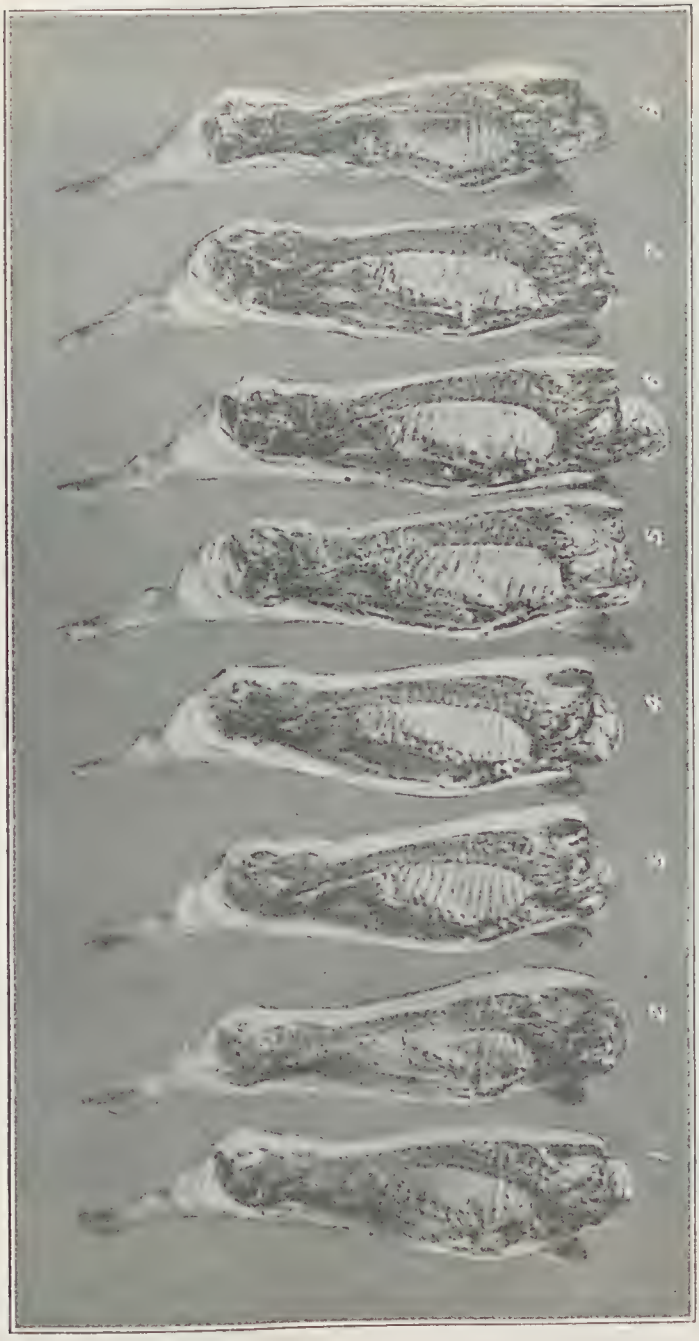
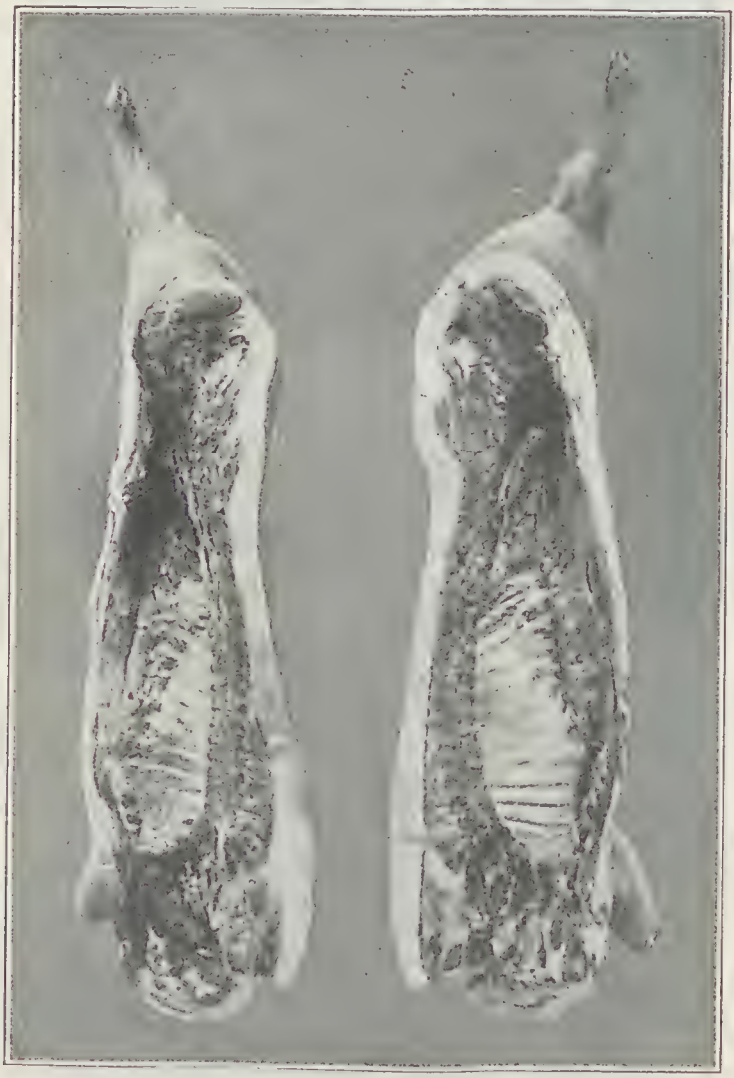


Illustration I.

7. Pigs to be killed in the presence of the stewards.
8. The judge to classify and value the bacon.
9. One whole side of each competing pig to be displayed, with its value and the number of points allotted to be shown thereon.



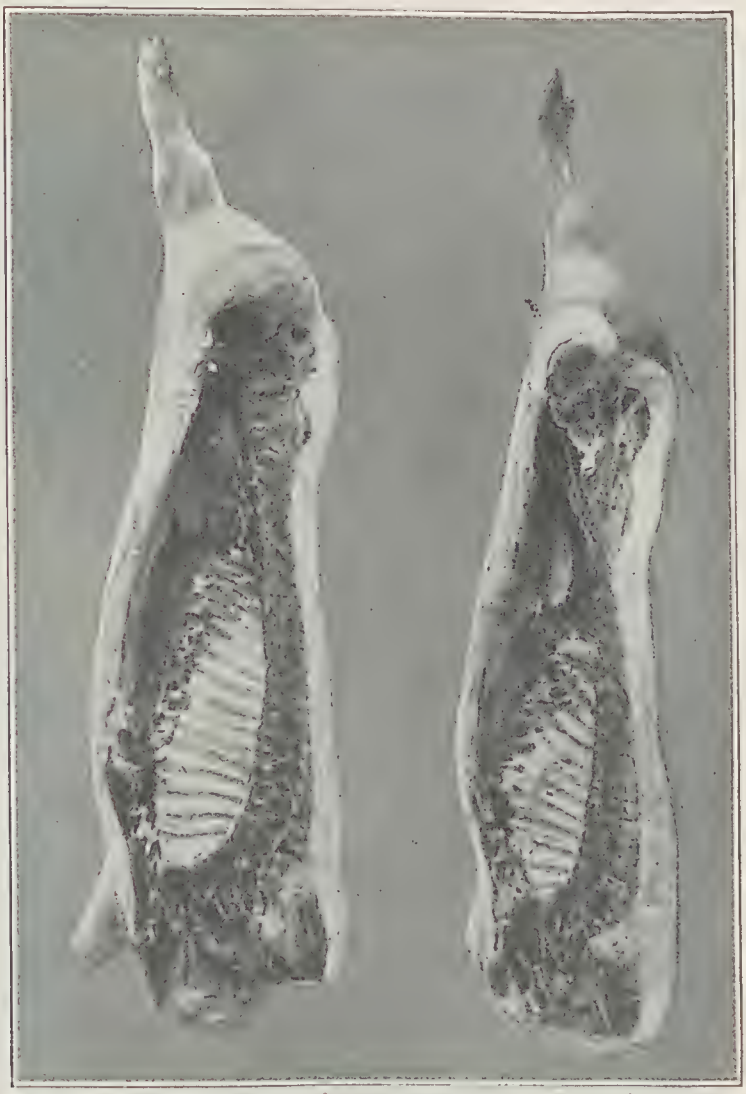
Berkshire. Berkshire.

Illustration No. II.

10. Carcasses to be kept in cool chamber for not less than twelve hours before being judged.
11. A competition for cross-bred bacon pigs, similar to that for pure-bred pigs, to be instituted.

THE SORT OF BACON THAT IS REQUIRED.

Perhaps a comparison of the illustrations will best convey to readers the sort of bacon that is required. The most striking feature is the evenness of back fat and the large proportion of lean in the sides numbered 5.



3. Middle York. 4. Middle York.

Illustration No. III.

6, and 8 (Illustrations I. and IV.) as compared with the others. The depth of flank compared with that of the shoulder in No. 8 is also noticeable. The three sides, 5, 6, and 8, are the only ones of the eight illustraed that could be classed as Grade 1 bacon, according to the English, Danish, and Swedish standards.

On this point, the latest figures from Sweden dealing with pigs exported from that country to England during 1924 and 1925 are enlightening:—

Average Measurements in Different Price Classes.

—	Grade 1.	Grade 2.	Grade 3.
Live weight at slaughter	201 lb.	206 lb.	208 lb.
Live weight gain per day..	1·35 lb.	1·39 lb.	1·38 lb.
Loss from live to dead weight	25·6 %	24·6 %	24·4 %
Length of middle	36·6 in.	36·4 in.	36·1 in.
Thickness of back fat	1·42 in.	1·62 in.	1·80 in.

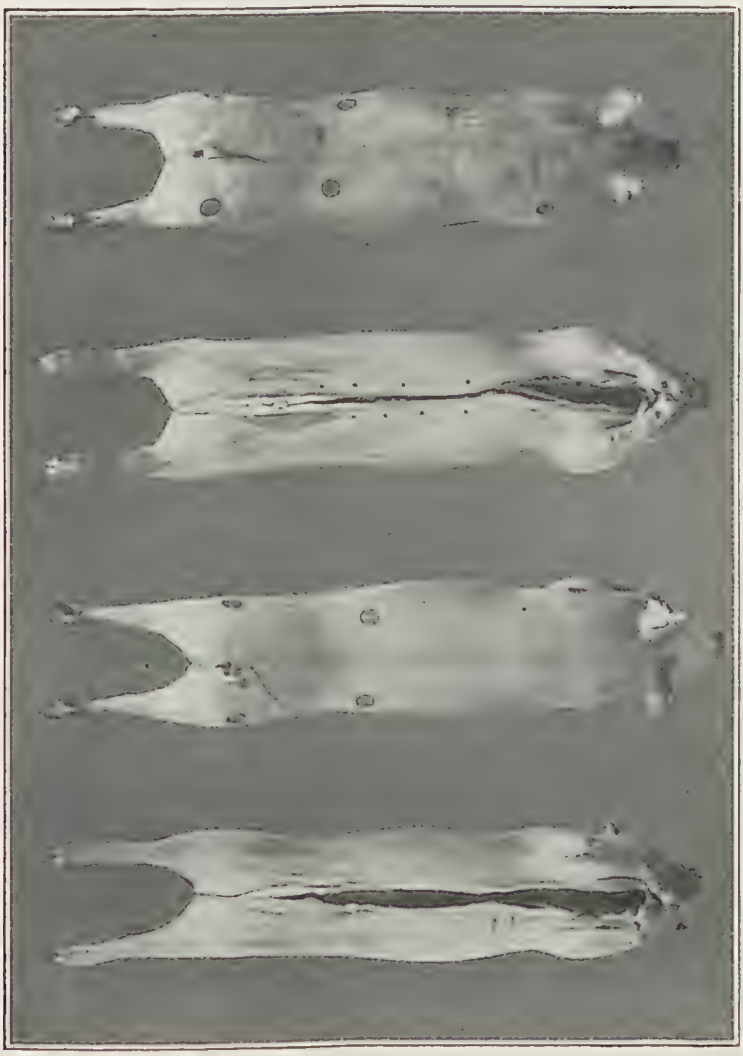
5. Large York. 6. Large York. 8. Gloucester Old Spots.

Illustration No. IV.

Of all the pigs examined, those in Grade 1 had an average back-fat thickness of 1.42 inches; even in Grade 3 the measurement was only a fraction over $1\frac{3}{4}$ inches.

Illustration V. shows four of the porkers of a consignment exported by the Western and Murray Bacon Company to the order of Messrs. John Cooke & Coy. This consignment was sold in London at the rate

of 1s. per lb. The quality of the consignment was considered satisfactory, as it compared favorably with pork from New Zealand, South Africa, and the United States of America. This, however, cannot be accepted as very flattering, for those who follow the English market quotations will know that pork from the countries named is not of the quality we should be satisfied with, for it is sold at considerably less per lb. than Grade 1 bacon brings.



Middle York, 1st Prize. Berkshire, 2nd Prize.

Illustration V.—Porkers.

Further, considerable difficulty was experienced by the exporters in getting together a sufficient number of carcasses at all satisfactory to complete the order. This clearly shows that the majority of the pigs produced here is not suitable for export; and before we can hope to receive any share of the £69,000,000 paid by Great Britain annually

for pig products, the method of breeding must be changed. To this end the use of the large Yorkshire boar on the best sows available will most certainly be the quickest and surest means of effecting (at any rate in part) the necessary improvement.

THE CARE OF HORSES' FEET.

By R. J. de Courcey Talbot, B.V.Sc., Veterinary Officer (broadcast through 3LO).

The care of horses' feet is a subject about which all horse-owners, and particularly farmers, should know something, because if his feet are not sound then the animal is for all practical purposes useless. It is sometimes said that if a horse's feet are well looked after then his legs will look after themselves, and although it would not do to take this quite literally, it contains a good deal of truth. Lack of attention to the feet is without doubt a contributing factor to many lamenesses in other parts of the leg, and this, of course, is quite apart from all sorts of foot trouble which occur as a result of neglect.

The Structure of the Foot.

Before proper care can be taken of the feet it is first necessary that one should have some knowledge of the structure and function of the various parts.

The foot of the horse consists of a variety of tissues which are enclosed in a horny covering called the hoof.

We are all familiar with the general appearance of the hoof, which may be likened to a horny box which covers the sensitive structures of the foot, or, as they are sometimes called, the "quick". Although the general conformation of the hoof is the same in all horses, it varies very considerably with the individual both in regard to size and, to a lesser extent, in shape. And then again each of the four feet of the one horse differs slightly one from the other, the front feet being rounder, less pointed at the toe, and more sloping in front than the hind, and even the right and left feet of both the fore and hind legs are also slightly different from each other.

Let us now consider, very briefly indeed, the anatomy of the foot. Buried in the centre of the foot and surrounded by the quick are the small bones which form the last joint of the leg. They are the pedal or coffin bone, the navicular or shuttle bone, and the lower extremity of the short pastern (or coronet) bone which reaches to just below the coronet or top rim of the hoof.

The pedal bone is roughly the same shape as the hoof, and it is completely covered by a series of fleshy leaves 500 or 600 in number. The edge of these runs from the top to the bottom of the bone, and they present an appearance like the leaves of an uncut book. These fleshy leaves dovetail, in a very intricate manner, into similar horny leaves on the inside of the hoof, and so form a very strong union between the hoof and the bone. It is this leaf-like tissue which is commonly called the quick. There are, of course, other tissues also between the bones and the hoof, but for the purpose of this talk it is unnecessary to mention them.

The outside covering of the foot, or the hoof as we call it, is composed of horn which is a hard, tough, gluey substance varying con-

siderably in consistency. Some varieties are as hard as a brick; others as elastic as rubber; a difference largely due to the amount of moisture contained. The hoof is not, as is generally supposed, one continuous horny structure, but is composed of three distinct parts—the wall, the sole, and the frog. Any one who is sufficiently interested may prove this by soaking in water for some time the hoof of a dead horse, when it will divide into the three separate parts.

The wall of the hoof is that part which is visible when the foot is on the ground, that is to say, it covers the front and the sides. At the heels it bends sharply back and runs forward for a short distance on each side of the frog, these recurved portions being known as the "bars". The horn of the wall is serrated, or manufactured we might say, by a layer of cells known as the coronary band which runs around the top of the hoof, and, therefore, the growth of the wall is from the top downwards. If it is neither worn nor cut, the wall will grow on indefinitely, the rate of growth being greater at the toe than the heel, and it has been estimated that this growth is from 4 to 5 inches in a year.

The sole is that division of the hoof which forms the floor of the foot. Its outer edges rest on the ground from which it is arched toward the centre. The horn of the sole is produced by a layer of horn-producing cells on the fleshy sole; its growth is, therefore, quite independent of that of the wall.

The frog of the foot is a thick wedge-shaped piece of horn fitted point foremost in the space between the angle of the heels and the bars which you will remember are the portion of the wall which curved forward. In the centre is a marked depression known as the cleft of the frog. In the normal foot the whole surface of the frog is in contact with the ground, and it, therefore, helps to sustain the animal's weight, but its main functions are to give a firm non-slipping foot-hold and to save the leg from the effects of the tremendous shock, jar, and concussion which the weight of a horse must produce every time the hoof comes to the ground, because at all paces it is the heel that touches the ground first.

Although there are many other structures of the foot of a horse, those that I have described to you are the most important.

Let us now consider what are the functions of the various parts of the foot. The bones, of course, act as a scaffolding, as it were, on which the soft parts can be securely based.

The blood supply is so bountiful in the foot that in addition to giving nourishment, it acts like a water-bed helping to equalize the tremendous pressures to which the whole structure is constantly subjected, and it helps to keep the bones and sensitive parts buoyantly supported.

The wall, by virtue of the fact that it is held firmly in position by the dove-tailed leaves which I have mentioned, is sufficient to bear the horse's weight itself, but this is no reason for depriving him of the bearing surface of the sole and the frog which also help to support the weight, so that on no account should the sole be unduly pared away, for not only will this lead to distorted feet and consequent lameness, but by thinning the sole we are making it easier for the sensitive structures under the horn to be injured, and a horse with a sole so thinned would travel only a short distance on a rough road before going lame.

In regard to the frog—if this is pared away as is sometimes done in the endeavour to make the foot look a neat job, then we are removing what we might call the non-skidding pneumatic tyre to the body, and the jar on the leg when a foot that has been so treated hits the ground,

can be likened to that experienced by a human being when riding in a car with flat tyres. Is it any wonder, then, that a horse whose frog is constantly cut away, very soon gets a distorted foot and develops some serious unsoundness in the leg?

Care of the Foot.

Having briefly discussed the structure and functions of the various parts of the foot, let us now consider the care which we must exercise to keep the foot in a normal healthy condition.

The majority of farm horses are unshod whilst working on the farm, and it is important to remember that, unless strict attention is paid to the feet of these unshod animals, serious injury will result. This applies also, indeed I may add especially so, to foals and young horses which are kept on the farm. The statement that injury may result to the feet in animals which are not shod may appear incorrect, because you will say that surely the unshod horse is in its natural condition, and the foot should, therefore, require no special attention; but, on a moment's reflection, you will realize that the average farm horse is working under anything but natural conditions. In a state of nature, and in its wild state, the growth of horses' feet is automatically controlled by wear, because the animals have unlimited freedom of motion in all sorts of country, varying from that of a hard rocky nature to swampy land, so that the growth and wear are balanced, and the foot is preserved to a proportionate shape. Under domestication, however, it is found that by leaving the feet alone, they either overgrow owing to want of friction (which they do not get in soft ground) or they become excessively worn, such as occurs when the animal is worked on hard ground. This latter condition is overcome by shoeing, which prevents any wear of the hoof.

On most farms, however, horses are worked on soft ground, and it is necessary to trim the feet frequently; but, unfortunately, this is not done often enough, and it is a common thing to see feet all shapes and sizes, with sometimes large portions of the horn breaking away from the wall, and sometimes cracks extending almost to the coronet.

Excessive growth causes disproportion of the foot, and this soon reacts injuriously on the limb. You will remember that the hoof grows faster at the toe, and thus the bearing surface of a foot which is overgrown, is carried too far forward from the vertical line of the limb. This, of course, must injuriously affect the joints and tendons of the leg because of the undue strain put on them. Then again, in an overgrown hoof the heels are higher than they should be, and that means that the frog is removed from contact with the ground, and it, therefore, becomes wasted from disuse. The heels under these conditions are inclined to close in and a contracted foot results.

Portion of the wall breaking away or being removed unevenly causes a twisting and distortion of the legs, which in foals and young animals is a serious condition, as the bones tend to grow in that form.

You will now realize, I hope, how necessary it is for the feet of unshod horses to be frequently trimmed, and in doing this certain points should always be borne in mind. The angle at which the wall meets the ground varies in different feet; but, as a general rule, it should be approximately 50 degrees in the front feet and slightly more in the hind. If the angle is less, then the toe is too long, if more then the heels are too high.

The next essential is that the bearing surface of the foot, that is, the part in contact with the ground, should be level. It is important

that there should be no excessive reduction of the heels or toes, and that when looked at from the front, both sides of the wall should be of equal height so that a line drawn through the coronet would be parallel with the ground surface, and a line drawn through the centre of the limb should cut the line of the coronet at right angles.

If the foot is trimmed in this way, then it is properly balanced; but, if this is not so, the horse will suffer. If either wall is allowed to be too long then the coronet is not parallel with the ground, and this will tend to throw the leg out of the vertical line and so lead to all sorts of troubles and distortion of the joints.

In dressing the feet no paring of the sole or slicing of the frog is required, as nature provides for the shedding of superfluous horn from these parts. However, any flakes of horn which are evidently just coming away from the sole may be pulled out, and any markedly ragged pieces of frog cut off.

All that is required to correct the overgrowth is the judicious use of the foot rasp to the lower borders of the wall. Do not wait until the horn is so long that cutters and the knife are required. Trim the feet regularly every three or four weeks.

These remarks in regard to trimming apply to all horses which are prevented by their surroundings from wearing down the hoof naturally. In young animals especially, a little periodic attention to the feet would ensure better conformation and more healthy feet and limbs.

Were it possible to always trace effects to their cause, it would often be found that round joints, straight pasterns and bent knees directly resulted from neglect of the feet in unshod young horses.

Shoeing.

In the few minutes allotted to me this evening I am unable to say very much about shoeing, but a talk on the foot would not be complete without some mention of this important subject.

Shoeing has frequently been called a "necessary evil," but there is, in my opinion, no evil about it if shoes are intelligently made and applied. If horses were worked on hard roads without shoes they would be able to do very little work without going lame, so that we need not further discuss the necessity of shoeing. The value of shoeing depends upon the manner in which the work is executed, and very seldom do owners appreciate this. Often the price charged or the distance to the forge regulates the choice of a farrier. This should not be so, as a bad workman may do an injury at one shoeing which will cost the owner more than would pay many times over for the extra trouble of taking the horse to a farrier who is known to be a good workman.

It should be borne in mind that a shoe under normal conditions is only applied to prevent excessive wear of the wall, and consequent injury and bruising of the sole. Therefore, it should be as light as possible, its weight depending on the amount and class of work that is required of the horse. A heavy shoes does not always mean a long-lasting one, for the iron may be so distributed as to wear quickly. A heavy shoe requires more nails than a lighter one, and an excess of nails should be avoided, for they may injure the wall and aid evaporation of the moisture from the hoof.

In regard to the time that a shoe should be allowed to remain on the foot, this, of course, varies slightly with each individual horse, but a

month is the usual time a shoe should be left on the foot without attention. At the end of this time the horn will have grown to an appreciable extent, and whether the shoe is worn out or not it is advisable to take it off and lower the foot. The actual wear of the shoes depend, of course, on the work done and the nature of the ground travelled over.

Feet Hygiene.

Now, just a few words on what may be termed feet hygiene. The stable and stable-yard should be kept clean so that the horse will not be continually standing in filth and moisture, which is the usual cause of such diseases of the hoof as thrush and canker. The feet should be picked out every morning, and also on the return from work. This is a detail which does not always receive the care it should, as apart from the necessity of cleanliness, the sole of the hoof is so liable to injury from accidents at work, that very frequent inspection of it should be made. The most convenient form of hoof-picker is a strong blunt iron spike or hook, and in use its point should not be forced down the sides or cleft of the frog with more vigour than is necessary to remove the dirt. Any sharp-pointed instrument is unsuitable for this purpose.

May I, in conclusion, express the hope that the application of the principles I have enumerated may be of material assistance in alleviating some of the disabilities to which our equine friends are subject.

THE IRRIGATION OF PASTURE LANDS.

An address by L. C. Bartels, B.Agr.Sc., Senior Irrigation Officer, broadcast through 3LO.

The term pasture land, in a wide sense, embraces any land which is grazed, even natural grass land; but, in its more restricted meaning, irrigated pasture means seeded pasture—grasses, clovers, and herbaceous plants sown singly or in mixtures.

In the earlier history of irrigation in the State, it was a common practice to spread the irrigation water over the natural grass land and to fill the swamps, which gave a good picking for stock. The method of distribution over the paddocks was crude—a high check was erected with the plough and delver, and as the water banked against it, it was forced to spread. Though some farmers still employ similar methods, there has been a general adoption of more refined practices in irrigation.

Lucerne growing has been the basis for development in many of the settlements where dairying is an important industry.

In most instances the practice of dairymen has been to graze the lucerne and other summer fodders, and winter crops of oats and barley are grown to provide supplementary feeding.

Although lucerne is so very productive it is not an ideal grazing crop. Of late there has been a move to sow grasses and clovers instead of lucerne only, and it is safe to say that with a proper appreciation of the value of careful watering and top-dressing, very satisfactory results will ensue.

At the State Research Farm there are paddocks of mixed grasses and clovers grown under irrigation, which have been down for some twelve years. There is no doubt about their permanence (most of the original elements of the pasture still flourish), their carrying capacity (they do well under heavy grazing), or their palatability.

Of course, the value of grasses and clovers has long been recognized in the more humid districts of the State (Gippsland and the Western District), but only lately has there been any move in a general way to sow them in the northern irrigation settlements. Lucerne is grown extensively in these districts, but it is very costly to cut and feed, and, as I have said, is not ideal for grazing.

In Rusden's *History of Australia*, in a chapter dealing with the governorship of King (1800 to 1806) the writer says:—"Clover and lucerne were cultivated, the latter yielding at least four cuttings a year, but few farmers used it because it was intolerant of being grazed upon."

Lucerne rebels against constant grazing, and it thins out, but the fact remains that it is widely grazed on irrigation blocks. In a previous talk on irrigating lucerne, I pointed out that about 2 feet of water per annum gives the best return. Greater quantities will increase the yield slightly, but the plant grows rankly, and the life of the stand is shortened.

Subdivision of the grazing areas will permit a proper rotation in watering and grazing. In this way one can avoid turning the cows on pastures where the ground is still soft, and thus the pugging of the soil with consequent damage to the plants is prevented.

In the different irrigation settlements I have visited I have seen splendid examples of irrigated pasture—the carrying capacity of which is attested by the owners.

At Wyuna, in a soil by no means first class, Mr. James Platfuss has a field of white clover and rye grass which is very striking. The clover developed in an old lucerne stand, and when I saw it it removed all doubt from my mind as to the adaptability of such pasture plants to the conditions in the Goulburn Valley.

At Tyntynder Central, on the Murray River flats near Swan Hill, I found another good example of the value of irrigated pasture. In this instance, however, it is a strain of strawberry clover which is the notable feature. I first saw this clover growing in competition with paspalum on the farm of Mr. G. McKerrow, and the number of stock which it supported was surprising. It came naturally, and I have since observed it in other parts of the settlement. It is a very vigorous grower, much stronger than ordinary strawberry clover. The leaves bear a distinct white marking, and the plant flowers and seeds freely. Although it does not grow without some moisture, I have noticed that it has great resistance to dryness.

Strawberry clover is particularly adapted to irrigation conditions, and a vigorous strain, such as this Swan Hill type seems to be, should prove of great value.

On the few visits I have made to Cohuna I have been struck by the possibilities of irrigated pastures there, and not long ago I had an opportunity of seeing on the farm of Mr. T. Major, at McMillan's, a very striking development of rye grass and white clover, which almost completely covered a lot of paspalum present. Mr. Major did not sow either the clover or the rye grass; where the former came from is not known; the rye grass from an adjacent area; yet now these two splendid pasture plants are growing freely on Mr. Major's farm. As in the other examples quoted, Mr. Major could not speak too highly of the carrying capacity of this area.

Many other cases could be quoted in illustration of the success following on the seeding of pastures under irrigation. This is not said with

any thought of discouraging farmers from growing lucerne on their irrigation holdings, or with any idea of suggesting that lucerne should be replaced with grasses. Lucerne deserves its title of king of fodder crops, and the best land on the block should be reserved for it. My advice is grow pastures in addition to your lucerne, not in place of your lucerne.

When irrigated lucerne is thinning out, as it will if grazed too severely, it is a good plan to introduce rye grass, Italian rye grass, and perennial rye grass. Seed may be sown in autumn mixed with super after the lucerne has been scarified, and under ordinary conditions the grass will be established satisfactorily in the lucerne.

I have seen them growing together in several places, at Rochester and Stanhope and elsewhere, and the result was a mixture which the dairy cows grazed with greater satisfaction than lucerne alone. It makes a more complete ration.

Sometimes as is happening in different places at Werribee, Bacchus Marsh, and elsewhere, white clover is spreading through the lucerne. It can resist the grazing, and has great carrying capacity, but will be improved by an admixture of rye grass.

In the preparation of land for irrigated seeded pasture, care in grading is as necessary as with lucerne. Grasses and clovers will survive watering abuses which would be fatal to lucerne, but that is no warrant for neglect in the preparation of the land or for failure to secure the conditions for an even distribution of irrigation water. Many of the elements in pasture mixtures are very sensitive to dryness, and unless the ground is evenly covered during watering the field will soon become irregular.

The only way in which regular watering can be effected is by properly grading the land. Bumps must be razed and depressions filled and checkbanks constructed to facilitate the application of water. I have previously dealt with the preparation of land for irrigated lucerne, and what I have said in that regard applies to the preparation of land for seeded pasture.

What is called the border system of irrigation is the best under ordinary conditions. In this system, the land is divided into long narrow bays by checkbanks which run down the slope if it is not too steep. They are usually from half a chain to one chain apart, and the bays may be from 5 chains to 15 chains long. Factors which determine the best sizes of bays to adopt are the slope of the land, the side-fall, and the porosity of the soil.

When the land to be irrigated is on a relatively steep slope, that is upwards of 3 inches per chain, the bays may be longer than where flat grades exist. If the soil is porous the bays must be shortened. The width of the bays is governed by the side-fall. To secure the spread of the water the bay must be levelled from side to side. Naturally where there is a big side-fall to be corrected in grading, the closer the banks are the less surface soil has to be removed from the higher side to be spread on the lower side.

Checkbanks must be made fairly strong because the tramping of stock will tend to break them down.

The water is introduced from the lateral channel at the head of the bay, and spreads from side to side, and advances in a sheet. The supply should be cut off while it is still some distance from the end, according to the judgment of the irrigator. This is an example of flooding as distinct from furrow irrigation or the spray system.

The border system makes irrigation relatively easy—wild flooding where the water has to be coaxed, as it were, by small furrows, and banks erected where they appear necessary, is more difficult.

The amount of water which is applied to pasture, and the number of times the pasture is watered, will have a big influence on the growth and on the character of the pasture. In regard to lucerne we have data on hand, the outcome of investigations at the State Research Farm, but we are only commencing similar tests with pasture mixtures.

We have nine plots, 5 chains long by ½ a chain, which were sown in September, 1925, and are this season receiving different treatment in regard to watering. One plot will receive no irrigation water, and the others will receive quantities varying from 18 to 36 inches. Some of the bays will be given similar quantities during the year, but distributed in a different way, e.g., 18 inches will be given to one bay in 6 lots of 3 inches, and to another bay in 3 lots of 6 inches. Three bays will receive 24 inches—one will get 6 lots of 4 inches, and another 4 waterings of 6 inches, and a third 8 of 3 inches. Two other bays will get six applications of 5 inches, and five of 6 inches respectively, while another will get six waterings of 6 inches. It is too early to forecast the results even for this first season. The plots show differences reflecting the different treatment, and the unwatered bay is in striking contrast to the others.

It seems likely that the frequent light waterings, such as eight of 3 inches, six of 3 inches, and six of 4 inches, will give better results than three 6-in. waterings or even four 6-in. waterings. Pasture grasses suffer if checked through dryness. Most irrigators know that lucerne will endure neglect in regard to watering. This resistance to drought is due mainly to its deep rooting habit, but the grasses are relatively shallow rooted, and if the soil is allowed to dry out between irrigations they will at least receive a severe check. Where lucerne which has been checked through dryness will respond to irrigation, neglected grasses and clovers have to gather fresh vitality before they can make vigorous growth.

There are cases where the available irrigation water is not reliable, or where it is not practicable to water frequently. In such instances a farmer may include lucerne, subterranean clover, Wimmera rye grass, tall oat grass, and Toowoomba canary grass in his pasture mixture, and secure good results.

Where water is regularly available the farmer should endeavour to maintain even conditions. Necessarily irrigation is an intermittent practice, and the moisture content of the soil varies from surface saturation to relative dryness, but, fortunately, the soil acts as a reservoir for moisture, and if care is taken to secure the entry of water into the soil it will be freely available to the plants between irrigations, but if conditions are such that the soil readily absorbs moisture, care must be taken to see that it does not get beyond the reach of the plant roots. This is waste, and such a practice may be attended by worse evils, such as the use of the water table and the concentration of soluble salts at the surface, which is the cause of the occurrence of alkali or salt. If land is porous and takes water readily, the better plan to adopt in irrigation is to apply water lightly and frequently. Bays may be relatively short, and unless unavoidable, cross checks should not be constructed. In some of the Mallee lands, for example, there should be no need for cross checks. I might say in passing,

however, that the adoption of the check system of irrigation would be more excusable with pasture than it is with lucerne.

There is another phase. Are pastures likely to succeed in lands which are so stiff that they absorb irrigation water only with difficulty, and where lucerne makes only stunted growth? In these soils which do not take water readily, irrigation should be frequent, and there should be an absorption of at least 3 inches of water. If the land is well graded, and the water spreads evenly, slow watering will probably achieve the desired result, but if it does not a supplementary watering given a day or two after the first will help.

Some grasses and clovers will endure excess water, but this does not mean that they may be overwatered with impunity, and I should say that, on the whole, the oversight of irrigated pasture calls for closer attention than does the management of lucerne. This is the reason why some of the settlers who are laying down seeded pastures may be disappointed. Overwatering and checks through dryness must be avoided.

Certain elements in the usual pasture are noteworthy because they flourish even in a water-logged soil—examples of these are Alsike clover and strawberry clover, and because there are often low-lying places which are not easily drained, such plants should be included. For some reason many farmeres have an idea that subterannean clover is also suited for water-logged places, but it does not like excess water.

The effect of excess water is to promote a rank growth of pasture. Stock do not like it, and will avoid patches where there is abundant growth, and confine their attention to the shorter and "sweeter" grasses. The palatability of grasses and clovers will be better if they are not over watered.

Pastures should be well irrigated in spring, particularly if the season is dry, but the distribution of available water over the season is necessary to prevent drying out of the soil. With two feet of water it should be possible to keep pasture in a luxuriant condition throughout the summer.

In a pasture containing a mixture of grasses and clovers, some one or another of the constituents will be prominent at all times, but I have seen a field where subterranean clover was practically the only plant growing. When it died down in October and November, good feed was available for a while, but irrigation then would not avail. The farmer waited till early autumn, and encouraged an early germination of the seed by regular watering, and thus was assured of an abundance of winter grazing. With scarlet clover a somewhat similar position exists.

Pastures are at their lowest state of productivity during early winter, and the irrigation farmer has the means at hand to grow winter feed by watering and top dressing his pastures in autumn to promote growth before the cold winter sets in.

The growing of winter feed is a very important phase of dairy farming, and the irrigation farmer has a choice of several valuable annual crops. He can sow them and bring them up without relying on autumn rains, but he should not leave the preparation of the ground till it is time to sow.

Under the supervision of the Irrigation Investigation Committee plots have been laid down in three centres—Swan Hill, Rochester, and Stanhope—primarily to test the adaptability of different grasses and

clovers under irrigation to the conditions at these places. The different standard clovers and grasses are sown on various mixtures. It is hoped that these plots will furnish information also regarding the best irrigation practice to adopt.

The plots at Rochester and Stanhope were sown last autumn, and they made splendid growth during the spring, and gave a bulk of feed which impressed all who saw them. The Swan Hill plots were sown the year previously, and gave a heavy yield of rye grass hay, and afterwards good pasture.

In conclusion, I should like to urge the irrigation farmer who is laying down pastures to have the same care in preparation and management as he would with lucerne.

Grasses will stand more abuses than lucerne, but they will not endure as much neglect, and to secure best returns they must be kept growing without check.

The appearance of the pasture is a good guide as to when watering is necessary.

RESULTS OF EXPERIMENTAL WORK.

TESTS WITH WHEAT VARIETIES AND MANURES.

A Wireless Talk by H. A. Mullett, B.Ag. Sc., Agricultural Superintendent, broadcast through 3LO, 11th February, 1927.

There is a team of officers of the Department of Agriculture who spend much of their time, both here and in the country, answering questions. Each is a veritable man "in grey" to the man on the land. People all over the State, and even beyond its boundaries, seem to think out agricultural "posers" and submit them to us in a ceaseless stream—by letter, by telephone, and by word of mouth. Here are some typical questions from to-day's mail:—

Question.—I am a wheat-grower at Carwarp in the North Mallee. The soil here is a red sandy loam; the rainfall 11 inches a year. What kind, and how much, manure should I use per acre for my wheat?

The *answer* is:—"Superphosphate (22 per cent. of phosphoric acid) is the manure you should use, and if the crop is to be sown on well-worked fallow, 90 lb. an acre will be the most profitable quantity to apply. On new land or on stubbles in your district, however, 60 lb. of superphosphates will be sufficient."

Question.—"I have bought 50 tons of superphosphate, 22 per cent. strength; is it more profitable to spread it at the rate of 56 lb. an acre and thus cover 1,000 acres, or should I place it at the rate of 1 cwt. an acre on 500 acres?"

Answer.—"In your district (Warrnambool) it will be most profitable to apply the manure at the heavier rate."

Question.—"Can I top-dress a paddock at Lismore now with safety?"

Answer.—"Yes. The manure may be applied at once. Little or none will be wasted, even although no rain falls until April."

Question.—"What variety of wheat does best at Horsham on the black soil there?"

Answer.—"Federation, Nizam, and Free Gallipoli."

That there is plenty of variety in the questions the following bear witness:—"How would you make concrete fencing posts? What mixture of irrigated grasses should be sown at Rochester? Which pickle do you recommend to prevent ball smut of wheat? Can loose smut be prevented by pickling? Please identify these samples of oats? Would you recommend the use of gypsum to improve the texture of stiff clay soils at Donald?

The members of the staff do not find these inquiries embarassing, and they do not furnish evasive answers or give matter lifted from text-books. On the contrary, in 90 per cent. of the cases they are able to send a definite reply based upon facts which have been ascertained by carefully planned experiments conducted by the Department, though, of course, there are still many problems to solve.

This experimental work is therefore of fundamental importance to the Department and the man on the land, and it is of the nature of this work and some of the more important results that have been obtained that I would speak to-night.

Really accurate tests, even of such a simple character as, say, the comparative yields of two varieties of wheat, are not nearly so easy as they may appear at first sight. All that seems necessary is to grow two half-acres, one of each variety, side by side, and compare the yields of both. But that will not settle the matter, because it is found in practice that the same result is not necessarily obtained each time the test is repeated even in the same year. Careful study has demonstrated that the management of agricultural experiments is most emphatically a professional job, and that the results of even the most accurately conducted trials cannot be accepted as thoroughly reliable until continued for at least three or four years, and in many cases even longer than that.

It is therefore obvious that a specially trained scientific staff is required for the work, and, moreover, that none but the simplest experiments can be undertaken by that staff on private farms. They must have at their service institutions where the whole resources of the farm can be dedicated to the experimental work.

The Department has two such experimental farms—the Central Research Farm at Werribee and the State Farm at Rutherglen, while at Horsham there is a sub-station at the Longerenong College. The experiments cover a wide range, and they include the breeding of cereals, the conduct of permanent investigations into the manuring of crops, the rates and times of sowing cereals, rotation systems, tillage methods, irrigation methods, the water requirements of crops, the top-dressing of pastures, the feeding of sheep, cattle, and poultry, and a great many others as well.

This work, which in a good many cases has been continued since 1912, has resulted in the building up of an extensive body of exact information on farming practice; and it is upon this information, after

it has been carefully tested out on private farms, that the teachings of the Department really rest.

Due recognition has been given to the fact that what is true at, say, Werribee, is not necessarily true in other districts, and to meet this requirement, demonstration plots are established on private farms throughout the country. Only thoroughly sound farmers are accepted to conduct plots, and the work is supervised by field officers. The Department determines the nature of the test and the method of conducting it, but the farmer himself does the work and is responsible for the farming practice. His advice on the results is valued. The interest of local agricultural organizations in the work is sought, and it is usual to hold field days at which the public may attend and see the results for themselves.

There are 31 of these plots scattered over the State; eight are devoted to wheat and oats, four to pasture top-dressing, six to potatoes, four to tobacco, and one each to maize and broom corn. In addition, there are six irrigation plots in which the Department is actively interested. So far, these tests have been limited to comparisons of various varieties and manures. In one or two instances, however, more comprehensive investigations have been conducted.

Wheat Manurial Trials.

Now, the way is clear for me to give you some of the more important results. First, as to the practice of manuring cereals. The remarkable response of most crops in this State to what amounts to a mere peppering of the land with superphosphate was first noticed about 1897, but the regular manuring of crops with that fertilizer was not generally practised until ten years later, and the value of top-dressing pastures was not widely recognized until about five years ago.

The earliest tests appeared to indicate that in the north the most profitable quantity of superphosphate for wheat was likely to be limited to about 56 lb. an acre; but the tests during the past ten years have conclusively demonstrated that it generally pays to put on much heavier applications. In no plot of wheat or oats, whether on rich volcanic soils, river flats, or light loams has superphosphate failed to give a profitable response. And for these crops no other form of phosphatic manure has given such good results as superphosphate. Indeed, most other fertilizers fail to influence the yield at all.

In general, the wetter the climate the greater the response to the manure, and, strange as it may seem, the better the soil the more it pays to manure, though there are exceptions to this rule.

It is usually the light soil which shows the greatest obvious differences in growth, though, after all, the actual gain in weight of the crop may not be as substantial as less observable differences induced on good land.

An exception is the light soil in that belt of country in the west of Victoria extending from Goroke down through Balmoral towards Hamilton. Here increases in yield of wheat averaging 13 bushels an acre per annum have been obtained by the use of 2 cwt. of superphosphate an acre in the test plots conducted at Goroke. The use of the manure makes all the difference between a worthless crop and a fair one. On the other hand, at Strathkellar, near Hamilton, on friable

black soils worth £20 to £25 an acre the yield of oats on the plots has been increased by 21.2 bushels an acre annually by the use of 2 cwt. of superphosphate an acre. The figures are for six years. In this instance the yield has been lifted to about 50 bushels an acre.

The most profitable dressing at Werribee on red clay loam for wheat is 1½ cwt. of superphosphate, and for oats a like amount. At Longerenong, on the black soil plains, 2 cwt. of superphosphate gives the most profitable response for wheat, but at Salisbury between 56 lb. and 1 cwt. an acre is sufficient. At Carwarp, in the North Mallee, it pays to use 90 lb. an acre for wheat on well worked fallow, but only 60 lb. for wheat grown on stubbles. Similar results have been obtained at Manangatang, and also at Walpeup.

At Walpeup, valuing the wheat at 5s. a bushel and the manure at £5 12s. a ton, the extra profit earnd as a result of the various applications of manure for the past two years is:—30 lb., 14s. 6d. an acre; 60 lb., 20s. 6d. an acre; 90 lb., 26s. an acre; 120 lb., 25s. 6d. an acre.

At Willaura, superphosphate at the rate of 2 cwt., an acre has been proved more profitable for wheat than 1 cwt, while at Numurkah on red clay loams the tests so far have not indicated profitable increases beyond 56 lb. per acre for wheat, but further work is necessary to finally settle the matter.

The average dressing of superphosphate used by farmers throughout the State on cereals is about 82 lb. an acre. The tests made during the past few years show that in many instances the quantity could be profitably increased.

I would like also to emphasize the fact that it does not pay to regard manure as a means of compensating for bad farming. In other words, if for any reason the fallow is neglected, or other essential features of the routine of cropping imperfectly performed, the addition of heavier quantities of fertilizer than usual is a mistake; rather should a reduction be made in the amount sown. So much for manures.

Wheat Variety Tests.

A word or two about varieties may be of interest.

The widespread recognition of the fact that some varieties of cereals give heavier yields than others has led to new varieties being eagerly sought, and though some are eliminated, a great many continue to be grown. A recent census revealed that there are about 148 wheat varieties sown in the State. Careful tests have shown that a great many of these are not so profitable as some others, yet they continue to be grown.

It is unwise to dogmatize on such a subject, but we can at least say that it is more than probable that if the number of varieties were reduced to about a dozen it would be of great advantage to all concerned.

I will again emphasize the difficulty of comparing new varieties with others on an ordinary farm. The results are likely to be most misleading. The only reliable guide is a series of accurately controlled tests carried out for at least three or four years. Especially is the present boom in new varieties for main crop sowing in the new Mallee districts to be deprecated. In every district there are wheats in general

use which have been tried and not found wanting. These should furnish the main crop. The purchase of new varieties only after they have behaved satisfactorily on official plots for at least four years is the wisest course.

Federation retains pride of place as the variety most widely sown in the State. In the Wimmera on the black soils it is still king; but it is being seriously challenged by new hybrids, curiously enough, in the most arid part of the State, the North Mallee, and in the moister parts of the wheat belt. The average results of tests at Longerenong for the past four years for wheat are:—Federation, 44.6 bushels an acre; Nizam, 44.4; Free Gallipoli, 43.1. There is really no significant difference between these results, and for all practical purposes the yields may be regarded as identical. On the other hand, at Nhill, some 50 miles to the north, on similar soil, in trials conducted over a like period, Free Gallipoli has indeed beaten Federation. The comparative yields are:—Free Gallipoli, 43.9 bushels an acre; Nizam, 42.2; Wannon, 41.8; Federation, 39.1. The difference here between Free Gallipoli and Federation is a significant one, because in every year of the test it is the same story. The up-to-date farmers in this district have tested Free Gallipoli and found it satisfactory.

The results obtained at Nhill are like to be applicable to the older Mallee, for example, at Sea Lake, Beulah, and so on. Further north in the newer country Federation can now be regarded as definitely inferior. Well proved varieties like Yandilla King and Currawa should form the bulk sowings. If newer varieties are required as well, Sepoy and Ghurka for early sowing will prove satisfactory. The results of a four years' trial at Carwarp are:—Sepoy, 21.4 bushels an acre; Ghurka, 21.3; Yandilla King, 20.8; Confederation, 20.6; Free Gallipoli, 21.1. Ranee, 19.9; Mac's White and Rajah, 19.3; Currawa, 19. 2; Federation, 18.1. Federation has been constantly low on the list, and Sepoy, Ghurka, and Yandilla King consistently high. The differences between the other varieties are probably not significant. For very late sowing, Mac's White and Rajah may be used, but they should not be used for a main crop, as they are liable to shed their grain in windy weather —Mac's White more than Rajah.

At Manangatang the tests have extended for only one year. Sepoy and Ghurka head the list, with Federation near the bottom.

At Walpeup, for a two years' average, the sequence is Nizam, Free Gallipoli, Sepoy, Currawa, Yandilla King, with Federation almost at the bottom of the list. These two latter tests are not conclusive yet.

In the Goulburn Valley, the only trials, apart from those at Dookie College, conducted for four years are those at Shepparton. The average yields are as follows:—Nizam, 28.1 bushels; Free Gallipoli, 27.1; Major, 24.6; Federation, 22.5. At Shepparton and the country to the east, Federation has lost caste, and can now be regarded as definitely superseded by Major for main crop, though Nizam and Free Gallipoli certainly merit close attention, as well as those varieties which the Dookie College authorities recommend after a test for that area. It is not yet possible to advise definitely for the country from Numurkah to the Murray. The experiments at Waaia, designed to serve this area, were commenced last year. Nizam has proved the best variety so far.

STANDARD HERD TEST.

Report for Quarter ended 31st December, 1926.

In the following is set out the records of all cows which completed a lactation during the quarter. The number is 170, of which 118 qualify for the certificate.

The amount of butter fat required for qualification varies according to the age of the animal (up to 5 years at time of calving), the standards being as follow:—

Junior 2 year old (under 2½ years at time of calving)	200 lb. butter fat.
Senior 2 year old (between 2½ and 3 years at time of calving)	225 lb. butter fat.
Junior 3 year old (between 3 and 3½ years at time of calving)	250 lb. butter fat.
Senior 3 year old (between 3½ and 4 years at time of calving)	275 lb. butter fat.
Junior 4 year old (between 4 and 4½ years at time of calving)	300 lb. butter fat.
Senior 4 year old (between 4½ and 5 years at time of calving)	325 lb. butter fat.
Mature cow 5 years and over	350 lb. butter fat.

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb	
H. Allez, Echuca West	3	2	Friesian	St. Alban's Pearl	Mature	542	20.12.25	273	16½	11,173	3·28	366·51	350	348, 378
				St. Alban's Witch	Mature	653	5.1.26	273	13½	9,351	3·33	311·09	350	220, 214
				Rockbank Pet	Mature	1370	12.3.26	273	19	8,968	3·95	354·17	350	321
J. Anderson, Jr., Lyndhurst	3	3	Jersey ..	Canary 17th of King's Vale ..	Jr. 2 yrs.	16582	20.12.25	273	13	4,690	5·26	246·56	200	
				Linda 52nd of King's Vale ..	Mature	9177	16.1.26	273	20	7,666	5·42	415·78	350	365, 441, 462, 482
				Lucy 8th of King's Vale ..	Jr. 2 yrs.	16590	1.3.26	273	15	4,605	6·37	293·14	200	
W. Atherton, Murraydale	1	1	Jersey ..	Quality of Meadow Vale ..	Mature	10133	13.1.26	273	..	6,303	6·35	400·06	350	293, 346, 375
W. K. Atkinson, Swan Hill	3	3	Milking Shorthorn	Fairy of Willow Park ..	Jr. 4 yrs.	13599	7.1.26	273	40	13,894	4·11	570·46	300	380, 528
				Duchess 5th of Willow Park	Jr. 2 yrs.	..	28.1.26	273	..	6,217	4·16	258·60	200	
				Bloom of Willow Park ..	Mature	11042	22.2.26	273	..	9,325	4·02	375·08	350	292, 287, 312

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
F. Austin, Lara	1	..	Jersey ..	Bell of St. Albans	Mature	9429	23.3.26	273	17½	6,639	4·81	319·44	350	185, 318, 365
J. Baker, Gheringhap	1	..	Red Poll	Karong Buttercup 2nd ..	Jr. 3 yrs.	..	17.3.26	273	10	4,851	4·19	203·27	250	
A. Balsillie, Bendigo	1	1	Jersey ..	Bluebell of Aberdour ..	Jr. 4 yrs.	14941	20.3.26	273	18	6,328	5·65	357·81	300	382
Mrs. I. Beard, Outtrim	2	1	Jersey ..	Bolinda of Linga Longa ..	Sr. 3 yrs.	14125	13.1.26	273	19½	4,318	6·96	300·61	275	293
				Shadow of Luscombe ..	Mature	6143	13.1.26	273	19	6,405	4·99	319·67	350	262, 281, 323, 196, 390, 359, 372
F. Bidgood, Staghorn Flats	1	1	Jersey ..	King's Larkspur of Staghorn	Mature	10152	28·3·26	273	16	5,757	6·20	356·87	350	
A. A. Broad, Sutton Grange	2	2	Jersey	Bunty 2nd of Coliban ..	Jr. 3 yrs.	15485	29.12.25	273	25½	7,498	5·90	442·39	250	365
				Dainty of Grangelea ..	Jr. 3 yrs.	15453	30.12.25	273	23½	7,347	5·49	403·46	250	296
Burnbank Cheese Co., Dhuringile	2	1	Friesian	Bainfield Topsy 15th ..	Mature	1175	15.12.25	273	14	8,127	4·22	342·62	350	350, 441, 421
				Burnbank Inka Sylvia Flower	Mature	1107	22.2.26	265	4	8,805	4·29	377·65	350	247, 344, 351
Messrs. D. Cameron and Son, Valencia, via Boisdale	3	3	Jersey ..	Werribee Wyandotte Cream ..	Mature	12244	20.1.26	273	31½	9,751	5·72	558·06	350	334, 475, 559
				Studleigh Duchess	Jr. 2 yrs.	18653	9.3.26	273	13	4,644	5·37	249·43	200	
				Dianthus of Springhurst ..	Sr. 4 yrs.	12215	19.3.26	273	15½	7,456	5·89	439·49	325	274, 393, 380
W. C. Cayley, Werribee	3	1	Ayrshire	Princess of Riversdale ..	Sr. 3 yrs.	13307	11.1.26	273	6½	5,925	3·63	215·10	275	227
				Bloom of Banyule	Mature	6750	24.1.26	273	18½	7,000	4·09	286·53	350	315, 382
				Majesty of Riversdale ..	Sr. 3 yrs.	13305	24.3.26	273	18	7,749	4·17	323·32	275	265

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
Capt. P. Chirnside, Oakleigh	2	2	Jersey ..	Graceful Countess of Bruce Vale	Jr. 2 yrs.	C.R.	5.1.26	273	13½	4,545	6·74	306·52	200	
				Werribee Attraction Fancy Madeira	Jr. 4 yrs.	13337	7.1.26	273	15½	7,815	6·16	481·11	300	329, 384
W. and J. Cockbill, Rockbank	1	1	Ayrshire	Fulham Gaiety	Jr. 2 yrs.	13334	26.2.26	273	18½	7,375	4·23	311·64	200	
Department of Agriculture, Burnley	1	1	Friesian	Victoria Free Martin ..	Jr. 3 yrs.	2067	16.3.26	273	29½	11,329	3·53	399·61	250	391
Department of Agriculture, Werribee	4	4	Red Poll	Victoria Fez	Jr. 3 yrs.	1155A	2.1.26	273	26½	9,021	3·46	312·30	250	
				Victoria Coronation ..	Sr. 4 yrs.	792B	23.1.26	273	7½	7,902	4·87	374·96	325	308, 295
				Beltana	Mature	239A	18.2.26	273	24½	9,147	4·16	380·14	350	269, 325, 346
				Victoria Velbelle ..	Sr. 2 yrs.	966AA	22.3.26	273	23½	5,463	4·60	251·08	225	
	2	2	Friesian	Victoria Joybell	Mature	995	10.1.26	273	26½	10,488	3·78	396·54	350	300, 322
				Victoria Corella	Jr. 2 yrs.	1704	23.1.26	273	17½	5,931	4·19	248·48	200	
H. Dettman, Kyneton	2	2	Jersey ..	Goldfield Trixie 2nd ..	Jr. 2 yrs.	18689	26.1.26	273	14	4,896	5·58	273·24	200	
				Belle of Ellematta	Jr. 2 yrs.	18688	10.2.26	273	15	4,230	4·89	206·80	200	
Dickinson Bros., Sebastopol	2	2	Friesian	Ashby Phyllis 5th	Sr. 3 yrs.	1171	15.3.26	273	22	9,718	3·21	311·75	275	308
				*Queenie 2nd of Ashby ..	Sr. 4 yrs.	1007	28.3.26	240	..	10,170	3·52	357·48	325	350
Dunbar Bros., Carlsruhe	2	1	Friesian	Bolobek Juliet	Sr. 3 yrs.	1193	8.3.26	273	33	10,509	3·13	328·47	275	309
				Ransome of Craigneil ..	Mature	1020	25.3.26	240	4	5,325	2·94	156·31	350	318, 377, 173

* Sold before completion of test.

STANDARD HERD TEST—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
S. Earle, Merricks	1	1	Jersey ..	Cymbal of Benguella ..	Jr. 3 yrs.	16638	3.2.26	273	..	5,371	4·94	265·53	250	232
G. Esler, Tongala	2	..	Jersey ..	Jubilee Lily	Mature	10454	18.1.26	273	14½	6,226	5·60	348·42	350	332, 326
				Linda of Tucrong	Mature	10482	19.2.26	273	6½	7,474	4·56	340·74	350	219, 217, 269
T. R. Findlay, Leitchville	2	1	Jersey ..	Sylvan Grey of Leven Brae ..	Jr. 3 yrs.	14150	20.1.26	273	14	4,447	4·22	187·72	250	201, 217
				Rose of Colac	Jr. 2 yrs.	14986	24.3.26	273	17	5,737	5·29	303·42	200	
Flack and Gamble, Berwick	3	3	Friesian	Dutch Girl 2nd of Berry ..	Mature	221	2.1.26	273	11	10,426	3·91	407·53	350	208, 327, 371, 391, 501
				Springfield No. 4	Mature	1082	28.2.26	273	21	13,050	3·49	454·99	350	293, 256, 409, 641
				Burnbank Cordele Beets ..	Jr. 2 yrs.	2118	12.3.26	273	40	12,754	3·26	416·37	200	
G. Gange, Werribee	4	4	Ayrshire	Priscilla of Glengowrie ..	Jr. 3 yrs.	11036	11.1.26	273	26	7,083	4·32	305·81	250	
				Aletta of Roseleigh ..	Jr. 3 yrs.	13475	17.3.26	273	18	6,714	4·43	297·57	250	221
				Eva of Roseleigh	Jr. 3 yrs.	13477	20.3.26	273	11½	6,186	4·55	281·32	250	310
				Annetta of Roseleigh ..	Sr. 2 yrs.	13476	21.3.26	273	12½	6,292	3·82	240·21	225	198
Geelong Harbour Trust, Marshall	7	4	Ayrshire	Mabel of Sparrovale ..	Mature	7315	11.1.26	273	20	6,775	3·88	262·90	350	256, 258, 278
				Verbena of Sparrovale ..	Jr. 3 yrs.	13566	11.1.26	273	16	6,178	4·84	299·26	250	219
				Mollie Riley of Sparrovale ..	Mature	9101	8.2.26	273	12	7,251	4·32	313·01	350	260, 273, 263
				Melody of Sparrovale ..	Jr. 2 yrs.	Vol. XIX.	9.2.26	273	10	4,561	4·18	190·69	200	
				Shirley of Sparrovale ..	Jr. 3 yrs.	13504	11.2.26	273	29	7,686	4·23	324·78	250	228
				Polly of Sparrovale ..	Mature	9166	26.2.26	273	29½	9,838	4·13	406·19	350	255, 368, 335
				Hygeia of Sparrovale ..	Mature	7311	13.3.26	273	28	9,325	4·21	392·68	350	274, 351 367
Gibson Bros., Trafalgar	2	1	Jersey ..	Wattleblossom of Leathorne	Jr. 4 yrs.	11430	29.1.26	273	10	4,642	5·95	276·17	300	230, 283
				Easter Daisy of Austral Park	Mature	11031	21.3.26	273	19	5,895	6·22	366·96	350	370, 419

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.		
R. Goodman, Kilmany	2	1	Ayrshire	Melba of Roseneath ..	Jr. 2 yrs.	13514	1.2.26	273	20½	5,172	4·00	206·74	200	
				Camelia of Roseneath ..	Sr. 3 yrs.	Vol. XIX.	23.3.26	273	13	6,223	3·92	244·09	275	172
T. Harvey, Boisdale	1	1	Jersey ..	Daisy 6th of Jerseyholm ..	Mature	5917	12.1.26	273	28	9,157	5·06	463·58	350	332, 415, 373, 392 419, 436
R. P. Hastings, New Gisborne	1	1	Jersey ..	Silvermine 32nd of Banyule ..	Jr. 2 yrs.	16694	28.3.26	273	13	4,605	5·09	234·42	200	
W. Henderson, Grassmere Home Farm	1	1	Ayrshire	Iris 2nd of Carracoorte ..	Mature	9384	21.1.26	273	26½	9,034	3·98	359·61	350	220, 305, 285, 221 411, 444
R. J. Henry, Euroa	1	1	Jersey ..	Little Ann of Cooel ..	Jr. 2 yrs.	16919	22.3.26	273	15½	5,025	5·58	280·47	200	
E. H. Howlett, Morwell	2	2	Jersey ..	Molly 15th of Banyule ..	Jr. 3 yrs.	11597	30.12.25	273	21	6,949	6·02	418·06	250	
				Sistine of Banyule	Jr. 3 yrs.	11605	17.1.26	273	19	6,001	5·65	339·03	250	
J. Hutchinson, and Son, Somerville	1	1	Jersey ..	Empress of Somerville ..	Jr. 2 yrs.	17762	4.2.26	273	27	7,467	4·36	325·21	200	
A. Joshua, Cloverfield	1	1	Jersey ..	Goldfinch of Cloverfield ..	Jr. 2 yrs.	16293	14.1.26	273	..	3,244	6·54	212·11	200	
G. Kent, Archie's Creek	3	2	Ayrshire	Bud of Woolamai Park ..	Mature	7434	8.1.26	273	9	6,724	4·45	299·49	350	211, 234, 299
				Merry of Woolamai Park ..	Jr. 2 yrs.	12357	5.2.26	273	19½	5,143	5·14	264·52	200	
				Blossom of Woolamai Park ..	Jr. 3 yrs.	11153	14.3.26	273	8½	6,744	4·63	312·26	250	282

STANDARD HERD TEST—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
Mrs. E. M. Lennie, Tongala	1	..	Jersey ..	Merella 2nd of Yarra Brae ..	Mature	5668	5.2.26	273	16	4,755	6·85	325·74	350	330, 307, 308, 392, 377, 395
Leongatha High School, Leongatha	1	..	Jersey ..	Sunset Star of Dunallister ..	Mature	5927	5.3.26	273	11	5,545	5·18	286·98	350	350, 380, 495, 469, 442, 372, 406, 390
C. D. Lloyd, Narrewarren	3	3	Jersey ..	Werribee Starbright 9th ..	Mature	6542	19.1.26	273	..	9,517	5·31	505·11	350	582, 511, 596, 494, 592
				Mercedes Sweet Star of Glen Iris	Jr. 2 yrs.	14169	5.2.26	273	..	5,131	5·97	306·13	200	
				Narkunda of Glen Iris ..	Jr. 2 yrs.	14171	10.3.26	240	..	4,635	5·38	249·17	200	
H. N. Littledike, Werribee	2	2	Jersey ..	Lotus Flower of Glenwood ..	Sr. 2 yrs.	17451	26.2.26	273	11	4,926	6·87	338·27	225	295
				Beryl of Paradise	Sr. 2 yrs.	16762	23.3.26	273	16	6,699	5·57	372·95	225	319
J. G. Lobb, Cardenia	1	1	Ayrshire	Bona Vista Marcia	Jr. 3 yrs.	12428	15.2.26	273	22½	7,663	4·13	316·49	250	303
Longerenong College, Dooen	1	..	Ayrshire	Wistaria of Longerenong ..	Jr. 4 yrs.	12439	9.3.26	251	4	3,740	4·78	178·94	300	233, 235
Mrs. L. Lowing, Tongala	1	1	Jersey ..	Violet of the Valley ..	Jr. 2 yrs.	18795	25.2.26	273	17½	5,296	4·40	233·46	200	
H. Luxton, Whittlesea	2	2	Jersey ..	Ozone of Terara	Jr. 4 yrs.	11506	31.1.26	273	21	6,980	5·02	350·35	300	258
				Sunbeam of Somerville ..	Mature	9418	15.2.26	273	21	7,266	5·22	379·53	350	307, 386, 405
C. G. Lyon, Heidelberg	4	4	Jersey ..	Silvermine 31st of Banyule ..	Jr. 2 yrs.	14197	3.2.26	273	23	6,739	5·53	372·59	200	
				Hawthorn 10th of Banyule ..	Jr. 3 yrs.	11584	8.2.26	273	22	8,857	5·92	524·28	250	330
				Silvermine 28th of Banyule ..	Jr. 3 yrs.	11604	17.2.26	273	23½	8,989	4·96	445·58	250	348
				Silvermine 29th of Banyule ..	Jr. 3 yrs.	14195	2.3.26	273	20½	7,936	4·88	387·37	250	330

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
M. Lyons, Bamawm	2	2	Jersey	Lassie Fowler 12th of Melrose	Jr. 3 yrs.	16697	27·2.26	273	17½	5,589	6·16	344·03	250	280
				Gay Girl of Eurungee ..	Jr. 2 yrs.	18824	24.3.26	273	16½	5,143	5·80	298·43	200	
C. W. Macauley, Rochester	2	2	Jersey ..	Rosebud of Taranah ..	Sr. 4 yrs.	11630	27.1.26	273	22	8,175	6·45	527·16	325	234, 281, 384
				Poppy of Taranah	Jr. 2 yrs.	18849	16.2.26	273	13½	5,065	4·87	246·78	200	
J. McDougal, Byaduk	1	1	Jersey ..	Laurel of Parkview ..	Jr. 3 yrs.	15544	21.3.26	273	17½	6,879	5·89	404·96	250	353
Estate of H. V. McKay, Sunbury	1	1	Ayrshire	Verbena of Ayrbrae ..	Jr. 4 yrs.	9978	16.1.26	273	10	6,984	4·41	308·12	300	232, 287
T. Mesley, Dalyston	1	1	Jersey ..	Agnes 2nd of Warenda ..	Jr. 4 yrs.	13375	8.1.26	273	18½	7,882	5·91	466·17	300	385, 514
Mrs. L. Orchard, Graham Vale	5	..	Jersey ..	Violet of Jersey Vale ..	Jr. 2 yrs.	18888	8.1.26	273	13	3,111	5·41	168·37	200	170
				Buttercup of Jersey Vale ..	Mature	11657	14.1.26	273	18	5,160	5·07	261·54	350	187, 323, 352
				Rose of Jersey Vale ..	Mature	9590	14.1.26	273	18½	5,106	4·92	251·01	350	198, 236, 225, 321
				Pansy of Graham Vale ..	Mature	5330	8.3.26	273	11	3,997	4·60	183·69	350	227, 213, 346, 226, 202, 267, 287, 223
				Daisy of Jersey Vale ..	Mature	10355	15.3.26	273	19	4,987	5·35	266·61	350	234, 295, 238
W. Parbury, Warburton	8	5	Jersey ..	Nancy Rosalind of Brookfield	Mature	18509	6.1.26	273	20	7,092	4·91	348·40	350	
				Verbena 7th of Brookfield ..	Sr. 3 yrs.	15596	17.1.26	273	21	6,421	4·65	298·64	275	
				Rosalind 5th of Brookfield ..	Jr. 4 yrs.	15589	20.1.26	273	19	6,264	5·52	345·59	300	
				Sunshine 5th of Brookfield ..	Sr. 2 yrs.	17815	8.2.26	273	17½	5,139	6·32	325·03	225	
				Rosebud 5th of Brookfield ..	Jr. 3 yrs.	15593	1.3.26	273	22½	6,805	5·07	345·02	250	
				Rosalind of Brookfield ..	Mature	9614	12.3.26	273	22	6,774	4·30	291·06	350	255
				Songstress of Brookfield ..	Mature	9618	13.3.26	273	18½	5,536	5·39	298·62	350	
				Golden Leaf 6th of Brookfield	Sr. 2 yrs.		28.3.26	273	13½	4,561	5·50	250·89	225	

STANDARD HERD TEST—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
D. Peter, Heidelberg	3	2	Jersey ..	Dunalister Mannikin's Attraction	Mature	10,381	5.1.26	273	12½	5,302	5·05	267·72	350	277, 268
				Dunalister Perree's Czarina 2nd	Jr. 2 yrs.	18,910	15.2.26	273	..	4,657	5·34	248·79	200	
				Dunalister Mannikin's Perrees Capture 3rd.	Jr. 3 yrs.	16,985	25.3.26	273	..	5,644	6·14	346·35	250	254
Miss H. E. Raleigh, Pakenham Upper	1	..	Jersey ..	Princess 3rd of Heatherby ..	Jr. 2 yrs.	18,923	9.1.26	273	11½	3,763	5·29	199·23	200	
J. D. Read, Springhurst	8	8	Jersey ..	*Bauhenia 2nd Springhurst ..	Sr. 2 yrs.	12,209	1.3.26	210	..	5,393	5·03	271·12	225	247
				*Clover 3rd of Springhurst ..	Sr. 2 yrs.	14,242	3.3.26	210	..	4,898	5·61	274·87	225	246
				Countess 3rd of Springhurst ..	Jr. 2 yrs.	16,965	12.3.26	273	17½	6,979	5·95	405·19	200	
				Furze of Springhurst ..	Jr. 2 yrs.	16,334	17.3.26	273	14½	5,304	5·55	294·15	200	
				Laburnum of Springhurst ..	Sr. 3 yrs.	14,249	22.3.26	273	20½	7,833	5·37	420·65	275	324
				Romneya 2nd of Springhurst	Jr. 2 yrs.	16,970	22.3.26	273	20½	6,463	5·34	345·10	200	
				Nightshade 2nd of Springhurst	Sr. 3 yrs.	14,255	23.3.26	273	18	6,469	6·09	394·24	275	333
				Chillie of Springhurst ..	Sr. 2 yrs.	14,241	27.3.26	273	24	9,180	4·48	411·72	225	309
Miss S. L. Robinson, Kew	1	..	Jersey ..	Mill Brown Duchess ..	Mature	11,689	4.2.26	273	19	5,358	5·60	300·25	350	208, 385
W. P. Rogen, Tatura	1	..	Jersey ..	Jubilee Musk	Mature	10,455	1.3.26	273	19½	6,951	4·61	320·68	350	136, 247, 334
G. Rowe, Kardella	1	1	Jersey ..	Sweet Pansy 5th of Melrose ..	Mature	7,400	30·1·26	273	16½	5,904	5·95	351·39	350	245, 311, 362, 319, 316, 371
L. L. Russell ..	2	1	Friesian	Burnbank Bonnie 2nd Mercedes	Sr. 3 yrs.	1,515	24.3.26	273	13½	6,220	4·03	250·85	275	262
				Mossvale Sylvia Keyes ..	Jr. 2 yrs.	2,229	27.3.26	273	17½	8,404	3·05	256·08	200	
W. A. Sandles, Mt. Best via Toora	1	1	Jersey ..	Primrose of Franklin Park ..	Jr. 2 yrs.	16,749	10.1.26	273	17	5,022	5·30	265·94	200	

* Sold before completion of test.

STANDARD HERD TEST—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
A. H. Schier, Kernot	14	4	Ayrshire	Scotswood Modena	Sr. 2 yrs.	15,489	6.1.26	273	17	4,974	4·64	230·94	225	
				Gold Point 2nd of Banyule ..	Mature	10,288	7.1.26	273	19½	7,939	4·43	351·50	350	224, 273, 371, 387
				Scotswood Stylish	Sr. 2 yrs.	14,161	20.1.26	273	15	5,412	4·60	249·07	225	
				Primrose 2nd of Pine Grove ..	Mature	4,640	24.1.26	273	20	5,637	3·98	224·29	350	246, 216, 267, 195, 223, 256
				Scotswood Madeira ..	Jr. 3 yr.	11,368	31.1.26	240	4	5,100	4·37	222·71	250	237
				Scotswood Sylvia	Mature	10,321	4.2.26	273	13	4,975	4·05	201·26	350	213, 194, 292
				Fine Quality of Gleneira ..	Mature	7,711	6.2.26	273	6½	4,570	4·53	207·00	350	187, 209, 262, 264, 294
				Scotswood Merline ..	Sr. 2 yrs.	15,487	7.2.26	240	4	4,140	4·02	191·13	225	221
				Merline of Inverleigh ..	Mature	11,363	12.2.26	273	..	5,818	4·66	271·32	350	196, 218, 283, 280
				Bettsie of Inverleigh ..	Mature	10,285	24.2.26	273	10	6,711	4·65	311·93	350	213, 242, 191, 290
				Scotswood Dainty	Jr. 2 yr.	15,475	26.2.26	273	..	3,765	5·07	191·06	200	
				Scotswood Model	Jr. 3 yrs.	14,155	18.3.26	273	11½	6,232	3·41	212·34	250	275
				Scotswood Modesty ..	Jr. 2 yrs.	15,490	27.3.26	273	15	5,765	4·03	232·10	200	
				Scotswood Daphne Brown ..	Mature	10,294	29.3.26	273	9½	5,887	4·08	240·28	350	189
Smith and Sons, Woodend	1	..	Friesian	Halcote Opera Girl ..	Sr. 3 yrs.	1,281	23.2·26	273	50	18,940	3·43	649·96	275	408
Simpson and Son, Lower Fern Tree Gully	7	5	Jersey ..	Dodo 2nd of Clarendon Eyre	Sr. 2 yrs.	15,038	20·1.26	273	16½	5,212	5·33	277·71	225	
				Daisy 8th of Melrose ..	Mature	10,362	25·1.26	273	18	7,638	5·72	437·20	350	422, 356
				Leonie 2nd of Clarendon Eyre	Mature	9,579	2·2.26	273	20	6,694	4·71	351·30	350	253
				Merry Lady of Hillcrest ..	Mature	7,042	15·2.26	273	18	7,951	4·20	333·90	350	317
				Silver Bell of Kameruka ..	Mature	6,038	19·2.26	273	24½	7,687	5·18	398·17	350	284, 383, 395, 449, 450
				Laura of Devon Park ..	Jr. 3 yrs.	12,898	26.2.26	273	13	3,742	6·16	230·57	250	294
				Leonie of Clarendon Eyre ..	Mature	9,578	16.3.26	273	18	7,774	5·05	392·56	350	353, 418
O. J. Syme, Macedon	1	1	Friesian	Bolobek Phoebe	Jr. 2 yrs.	1,484	22.2.26	273	20½	9,009	3·88	349·48	200	
L. W. Thompson, Pakenham	1	1	Jersey ..	Meadow Sweet of Warenda ..	Mature	9,567	28.2.26	273	20½	7,231	5·57	402·88	350	404, 439, 484, 325

Standard Herd Test—*continued.*

Owner.	No. completed Test.	No. Certificated.	Breed.	Name of Cow.	Age Standard.	Herd Book No.	Date of Calving.	Days in Test.	Milk last Day of Test.	Milk.	Average Test.	Butter Fat.	Standard required.	Previous Yields of Butter Fat in lbs.
									lb.	lb.		lb.	lb.	
F. Trevaskis, Tongala	2	2	Jersey ..	Lady Meadow Sweet of Bruce Vale	Jr. 2 yrs.	18,662	3.1.26	273	14	4,903	6·53	320·24	200	
				Lady Golden 2nd of Bruce Vale	Jr. 2 yrs.	Vol. XIV.	19·1·26	273	13½	4,983	6·24	311·18	200	
J. T. Tweddle, Sunbury	3	2	Friesian	Westmere Pontiac Ormsby ..	Jr. 3 yrs.	1,715	10·1·26	273	15	5,218	3·80	198·30	250	275
				Burnbank Rosie Triumph ..	Jr. 2 yrs.	2,139	2·2·26	273	25	6,714	3·63	243·46	200	
				Burnbank Holland Lassie Triumph	Sr. 2 yrs.	1,807	10.2.26	273	33½	13,449	3·72	500·11	225	
J. T. Tweddle, Berwick	1	..	Friesian..	Burnbank Dutch Princess ..	Jr. 4 yrs.	1,518	9·3·26	273	17	6,991	4·10	286·69	300	243, 284
H. L. Webb, Sunbury	2	1	Ayrshire	Alice of Holly Green ..	Jr. 3 yrs.	11,493	9·1·26	273	16	8,101	4·14	335·52	250	260, 256
				Myra of Holly Green ..	Sr. 3 yrs.	11,499	21·1·26	273	12	6,306	4·03	254·32	275	259, 244
S. K. Webb, Neerim North	1	1	Jersey ..	Alandale Pearl	Jr. 2 yrs.	17,509	3·2·26	273	13	4,140	6·34	262·56	200	
J. Wills, Bacchus Marsh	3	1	Friesian	Rosie 55 of Lilydale ..	Mature	1,140	13·2·26	273	7½	8,901	3·83	341·04	350	235, 345, 450
				Lerderberg Snowglow ..	Jr. 2 yrs.	2,213	10·3·26	273	20½	5,973	3·78	225·66	200	
				Springfield No. 8	Mature	1,139	23·3·26	273	11½	9,417	2·61	247·36	350	281, 280
W. Woodmason, Oakleigh	4	3	Jersey ..	Blossom 9th of Melrose ..	Jr. 2 yrs.	19,033	18·1·26	273	18	5,214	5·09	265·86	200	
				Graceful Duchess 19th of Melrose	Mature	7,540	26·1·26	273	26	7,449	6·52	485·98	350	325, 404, 438, 433 466, 360
				Jessie 36th of Melrose ..	Jr. 4 yrs.	19,035	28·1·26	273	15	4,567	5·89	268·94	300	
				Zoe 8th of Melrose ..	Jr. 2 yrs.	Vol. XIV	8·2·26	273	11	3,363	6·57	220·88	200	

CROP AND FALLOW COMPETITIONS IN THE WESTERN MALLEE, 1926.

(WALPEUP, UNDERBOOL, AND BOINKA.)

Observations by the Judge, J. Brake, B.Ag.Sc., Senior Inspector of Agriculture.

The endeavour to excel which is stimulated by competition is the finest thing possible for the progress of the individual as well as of the State. There is an unconscious effort made in competition which enables a competitor to obtain a better result that often means the difference between success and comparative failure.

In this manner crop and fallow competitions are a potent factor in the development of better methods and higher yields. An indication of their value in this direction was evidenced at Walpeup this season by higher yields, purer varieties, and better workmanship, the latter especially standing out in comparison with the exhibits of the previous year.

There was practically an absolute freedom from drill misses which are so unsightly, wasteful of ground, and helpful to weed growth. The mere fact that a crop has been well drilled does not at first sight appear very important, but the implication and the results are very far-reaching. In bad cases the waste of ground is enormous. Supposing we took a 90-acre square paddock and drilled it with a10-ft. wide drill, leaving space enough for one row of wheat unsown between each drill width, then the wasted ground in the whole paddock would total just 5 acres. If the crop yielded 6 bags per acre, the direct loss would then be 30 bags at, say, 5s. a bushel, equalling £22 10s.!

Then what of the weeds? Everybody is aware how quickly weeds take advantage of these misses in the sowing; under the protection of the surrounding crop they flourish undisturbed, and multiply themselves a hundredfold. How unwise it is to allow this when it necessitates such a lot of time and work subsequently to kill the weeds on the fallow.

The man who is careful with his drilling is certain to be careful in ploughing, in cultivation, in pickling, and in the whole hundred and one operations concerned in the production of the crop, and it is only by the exercise of constant care throughout that big yields may be obtained.

Purity of Seed.

The influence of the competition and the presence of the experimental plots in the district are apparent in the purity of the crops. The seed from last year's winning crop of Mac's White, which gained high marks for purity, was seen reproduced this year, and advantage was taken to obtain seed from the varieties sown on the plots. The seed of the proved varieties, Sepoy and Ranee, which topped the yields with 24 bushels per acre on the plots in 1925, was retained and sown by Mr. Gniel.

Takeall Disease.

The lower yields promised by some of the competing crops were in the main due to the presence of the disease "takeall." Very few Mallee crops have escaped some attack from takeall this year, but there is no doubt that the remedies advocated are successful in checking it. The stubble of the affected crop should be burnt, an oat crop sown after the wheat, and early and thorough fallowing practised. A rotation of crops which allows the paddocks to run back into native and barley grass should be avoided, as these grasses act as hosts for the disease, and will carry it on in the soil.

The advantage to be dervied from such a precaution is to be seen on the farm of Mr. P. G. Stewart, at Carwarp, who practices a four-course rotation of fallow, wheat, oats for hay, oats for grazing; this allows no room for grass at all, and consequently provides no host for the disease. As there is so much takeall in the district this year, the absence of attack on Mr. Stewart's property is most marked.

Mr. Pattinson's Winning Crop at Walpeup.
Variety—Mac's White.

Fallow Competitions.

Following the formation of a branch of the North-Eastern Mallee Better Farming Association, and the visit of the Better Farming Train to the district, large crop and fallow competitions were inaugurated at Underbool and Boinka last year. At Underbool 44 fallows of 90 acres each were exhibited in the senior section, whilst ten boys under eighteen years of age competed with 10 acres each in the junior section.

At Boinka six entries were received. The sandy hills on the fallow exhibited by Mr. C. Brown had been ploughed once, and then left unworked with the idea of preventing drift. This plan certainly does

enable the hill to resist the wind, but the remedy is possibly worse than the disease, as the hills were covered with barley grass and native grasses which act as such splendid hosts to "takeall.' If the sand hills are to be left uncultivated, it would be far better and more profitable to fallow the flats and to sow down the hills with oats for grazing purposes, prevent them seeding, and plough in the stubble just prior to the sowing of the wheat crop. In that way the oats would prevent barley grass from growing, and so lessen the risk of takeall, and in addition excellent sheep feed would be provided. The sheep will assist in the consolidation of the soil, and enrich it with their droppings.

As the sand hills have at all times sufficient moisture, the wheat crop would possibly not suffer from any lack in this respect. However, the treatment outlined has not yet been thoroughly tested, and, in consequence, can only be advocated as an alternative to the non-fallowing of the sand hills. It should not replace careful fallowing, except perhaps in the case of hills exceptionally liable to drift.

Wheat Fields near Underbool—a fifteen-year-old Mallee District.

Preparation of Fallow.

There is no doubt that the quality of the fallow decides, more than any other factor, what yield will be obtained from the crop, particularly in regard to the last few bushels, and it is these which represent the profit. That being so, the preparation of the fallow should be looked upon as among the most important work on the farm.

The objects of fallowing are to conserve moisture, prepare a seed bed, release plant food in the soil, and kill weeds and disease. The maintenance of loose surface mulch prevents moisture from rising to the surface where it would be lost by evaporation. The best depth for the mulch will vary according to the type of soil and the time of year.

In the loose Mallee soils best results are obtained from a mulch of about 2 inches. The practice advocated is to plough not deeper than 3½ inches, and then to concentrate on shallower cultivation with the idea of building up a firm, level, and even seed bed beneath the mulch.

The seed should be sown on a firm bed beneath a 2-inch loose mulch, in order that the young roots may strike immediately into soil well stocked with moisture and available plant food. When the soil is loose

beneath the seed, there is too much air present for best growth, and the result is delayed and irregular germination.

Although the storing up of moisture is, perhaps, the most important consideration in the preparation of a Mallee fallow, another object which is too often overlooked is the chemical changes carried out by the millions of bacteria in the soil. When a fallow is maintained in a friable, well tilled condition, these bacteria can do their best work, and are actually changing portion of the soil, which would otherwise be useless, into readily available and valuable plant food.

This important point should not be lost sight of, because there is food released from the soil in this way which is of a totally different nature from that contained in superphosphate.

It is fortunate that the operations required in the preparation of a good mulch and a good seed bed are also effective in the destruction of weeds and such of the diseases as are able to live in the soil.

Weeds on the fallow provide good sheep feed at times, but it must not be forgotten that all the while they are using up a lot of the stored moisture, besides being a potential danger in scattering their seeds to grow up amongst the crop in the following year. All weed seeds should be constantly encouraged to grow on the fallow in order that they may be completely destroyed by grazing sheep and by cultivation.

Good fallowing is definitely helpful also in the eradication of certain diseases from the soil. Flag smut and takeall can both infect soil, and thence attack the crop. In a paddock containing either of these diseases the stubble should be thoroughly burnt, and an oat crop grown before the next fallowing. If the fallowing be thorough the majority of the spores of both diseases in the ground will germinate, and, in the absence of a suitable host plant, will perish.

The fact that takeall is able to thrive on barley grass, &c,, makes it imperative that no weeds should be allowed to develop on the soil undergoing preparation for cropping.

Preparation for Crop—Summary.

In conclusion, it might be helpful to briefly run over the special points to look to in the sowing of the crop.

As far as the competition is concerned, a maximum of 100 points may be obtained for the crop, divided up as follows:—Estimated yield at time of judging, 35 points; purity and trueness to type, 20 points; absence of weeds and disease, 15 points each; and 15 points for evenness.

In the Mallee it has not always been easy to obtain good pure seed, but gradually the supply is increasing. A variety should be selected which has proved itself on official plots to be a high yielder over a number of years. As seed wheat it will naturally be clean of weeds and disease, but that does not do away with the necessity for pickling. The grain is pickled with dry copper powder (2 oz. per bushel of wheat), or with formalin (1 lb. to 45 gallons water) to prevent ball smut.

It is important to get sowing carried out at the best time, which in the Mallee is early—say before the 15th May. On good fallow 60 lb. of seed with 90 lb. of superphosphate sown together are the most profitable dressings to apply. The drilling should be even, with no missed land.

Not more than three or four varieties should be sown; they may be selected from those wheats giving best results at the Walpeup experimental plots. Of these wheats, Free Gallipoli, Sepoy, Ranee, Currawa, and Yandilla King consistently give good results, and may be sown with confidence. The first three are obtainable from the Department of Agriculture, whilst Currawa and Yandilla King are extensively grown by reliable Mallee farmers.

Careful attention to these points would be the means of very soon doubling the wheat loadings at the various stations, to the enrichment of competitors and great advantage of the State

Awards.

Walpeup.

100 acres of crop, 1926.

Aggregate for fallow 1925, and crop on same fallow 1926.

Competitor.	Yield.	Trueness to Type.	Absence of—		Evenness.	Total for Crop, 1926.	Total for Fallow, 1925.	Grand Total Crop and Fallow.
			Weeds.	Disease.				
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
A. McKinnon	32	18	14	13	15	92	77	169
G. W. Pattinson ..	35	18	14	14	13	94	72	166
T. Bell	30	17	14	14	14	89	76	165
L. McGregor, No. 2 ..	29	17	13	12	14	85	73	158
L. McGregor, No. 1 ..	21	17	14	13	14	79	75	154
F. Le Couteur	21	16	12	13	13	75	72	147
R. McInnes	18	17	13	13	14	75	71	146
J. H. Inglefield, No. 1 ..	16	16	12	12	13	69	75	144
J. H. Inglefield, No. 2 ..	10	16	12	11	13	62	76	138

Comments on the Walpeup Crops.

The first four crops promised much heavier yields than the remaining exhibits. Mr. G. W. Pattinson showed 70 acres of Mac's White, 12 acres of Bald Early, and 46 acres of Joffre. The Mac's White seed was obtained from the Carwarp Experimental Plots, through Mr. P. G. Stewart, and the whole was pickled with formalin and sown in May at the rate of 70 lb. per acre, with 90 lb. of 22 per cent. superphosphate. Each variety was comparatively true to type, and more than ordinarily free from weeds and disease. Takeall was present, but not in any quantity. The drilling was rather below first-place standard; but, generally speaking, the crop was an excellent production. It won the crop section and finished second in the aggregate of fallow and crop.

Mr. A. McKinnon followed up his win in the fallow section by a very fine paddock of Federation, Ranee, and Currawa, taking second place in the crop and first place in the aggregate of fallow and crop. It is interesting to note that the Federation seed was obtained direct from the local experimental plots, where it averaged 22 bushels per acre in 1925, and that Mr. McKinnon's 21 acres promised 30 bushels this year. There were ten acres of Currawa, which had been tipped slightly, how-

cver, and the 72 acres of Ranee also suffered to some extent from take-all. Apart from some barley seen in Ranee, the paddock was fairly free from weeds.

The seed was pickled with bluestone, but any consequent loss in germination would probably be counteracted by the heavier seeding; it was sown at the rate of 80 lb. of seed and 100 lb. of super, in the third week in May.

Underbool.

FALLOW NOT LESS THAN 90 ACRES.

Competitor.	Mulch.	Moisture.	Absence of Weeds.	Cultivation.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
Burstall Bros	23	21	24	23	91
A. Maxwell	23	20	21	23	87
F. C. Smith	21	20	21	22	84
H. J. Amos	22	19	20	22	83
R. Lynch	21	19	21	22	83
S. Pole	21	19	20	22	82
E. Jenkins	22	21	19	20	82
H. Robinson	21	19	21	20	81
F. E. Southwell	21	19	20	20	80
J. Helyer, No. 2	21	20	19	20	80
J. Helyer, No. 1	21	19	19	20	79
J. Wisneske	20	20	19	19	78
R. Wandell	20	19	20	19	78
W. Jackson, No. 1 ..	20	19	19	19	77
L. Elliott	20	22	17	18	77
C. Renkin	19	19	20	19	77
O. McCabe, No. 2 ..	19	19	20	19	77
A. Anderson	18	20	19	20	77
H. Robinson, No. 1 ..	20	20	19	18	77
W. Ballantyne	19	19	19	19	76
R. Renkin	19	20	19	18	76
W. T. Sharp	20	19	19	18	76
W. H. B. Mossop ..	19	18	19	20	76
M. Jackson	20	19	19	18	76
J. Outen	20	19	19	18	76
A. Lynch	19	19	18	19	75
O. McCabe, No. 1 ..	19	18	18	19	74
J. Wilson	19	19	18	18	74
W. Jones and Sons ..	19	19	18	18	74
D. McDonald	18	19	19	17	73
W. A. Borgelt	18	18	18	18	72
W. Jackson, No. 2 ..	18	18	18	18	72
W. Callahan	18	19	18	17	72
S. T. Rothwell	18	18	18	17	71
W. Aikman	18	19	17	17	71
A. Kilpatrick	16	19	19	17	71
F. Hayter	16	18	17	19	70
C. Darrington	17	19	17	17	70
E. W. Mossop	17	18	17	18	70
C. Brown	16	19	16	18	69
A. A. Martin	15	18	17	19	69
A. H. McVicor	17	18	17	17	69
G. H. Dunstan	17	19	17	16	69
W. Gullett	18	18	16	17	69

UNDERBOOL.

FALLOWS (10 ACRES), OPEN TO COMPETITORS 18 YEARS AND UNDER.

Competitor.	Mulch.	Moisture.	Absence of Weeds.	Cultivation.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
Reg. Jenkins	22	21	20	21	84
Jack Brown	21	20	21	21	83
Laurie Wandell	21	19	21	21	82
Jacob Wisneske	20	20	21	21	82
Michael Wisneske ..	20	20	21	21	82
Donald Pole	21	19	20	22	82
Frank W. Southwell ..	21	21	19	20	81
J. S. Beattie	20	20	20	20	80
W. G. Elliott	20	21	17	18	76
Neil Elliott	20	21	17	18	76

Mr. McKinnon's Crop of Ranee at Walpeup.

The leading fallow in the Underbool senior competition was presented by Burstall Brothers. The soil was a comparatively heavy loam, which lent itself admirably to careful preparation. This was made the most of by the owners who without doubt presented it in excellent trim. The paddock had previously been cropped with oats, and, prior to that, wheat. After the burning of the grass and stubble oats it was ploughed in July with the mouldboard to 3½ inches, crossed with the springtooth cultivator 2 inches deep in August; harrowed early in September, and again crossed with the springtooth cultivator 2 inches deep in early October. All workings were done after rain.

Mr. A. Maxwell gained second place with 87 points. The paddock had been under oats for three years, then grass for one year before fallowing. It was also ploughed in July with a mouldboard plough 3 inches deep, harrowed and cross-harrowed in August, springtoothed in early September, and cross springtoothed shallowly later in the same month.

Mr. F. C. Smith was third with 84 points, and Mr. H. J. Adams fourth with 83. The latter advises that the whole of the work was carried out by Mr. Kay, who is to be commended on the attainment of his object, namely, a first class fallow, indicating very careful workmanship.

Farmers' Field Day, Walpeup—October, 1926.
(Wheat and Oats Experimental Plots.)

BOINKA.

FALLOW NOT LESS THAN 90 ACRES.

Name.	Mulch.	Moisture.	Absence of Weeds.	Cultivation.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
S. D. Kinnersley ..	21	20	21	21	83
C. Bond	20	19	20	20	79
J. L. Morrison	20	19	19	19	77
E. H. Jones	19	19	18	19	75
M. Ryan	18	18	18	19	73
J. A. Cresp	18	18	18	18	72

FEDERATION WHEAT IN AMERICA.

In a letter to a Melbourne correspondent, the Secretary for Agriculture, Washington, says that Federation wheat, which was introduced into the United States by the Department of Agriculture in 1915 and first distributed for commercial growing in Oregon in 1916, is now largely grown on the Pacific Coast, and in the inter-mountain States. The area sown with this variety in the year 1925 was about 400,000 acres.

MANANGATANG CROP AND FALLOW COMPETITION, 1926.

Report by R. G. Thomas, M.Ag.Sc., Inspector of Agriculture.

The Crop and Fallow Competition conducted by the Manangatang branch of the Better Farming Association attracted five entrants. This can be regarded as a satisfactory initiation of the competition. The fallows were judged in the autumn, and the crops grown thereon were inspected in October. Crops generally were of good standard, for it must be remembered that, whilst the past season was a fairly favorable one, the previous season was not at all favorable to the thorough preparation of the fallows. This condition was probably responsible for the presence, in some crops, of a considerable amount of the diseases Flag Smut and Take-all. In this connexion the attention of the Society is drawn to the fact that a more comprehensive report dealing with such matters of general interest will be issued on the Manangatang and Cloonan Cup Competitions.

The Competition.

First place is awarded to Mr. E. G. Elliott, the entries of Messrs. C. H. Westblade and C. Cooper being second and third respectively in the crop section, and equal for second place in the aggregate.

Mr. Elliott's crop comprised sections of the varieties Ranee, Currawa, Mac's White, and Federation. At the time of inspection this crop looked remarkably well, being very even and showing little indication of any disease. The Ranee variety contained a fair number of foreign heads; Federation contained only a few, and both Currawa and Mac's White were good in this respect. The Federation, a small area only, contained some weeds, and was somewhat burnt off in appearance; the remainder of the crop was clean and apparently very healthy.

The cultivation given this land was as follows:—Mouldboard ploughed to a depth of 3 inches in June, and harrowed immediately; spring-tooth cultivated in July, harrowed September, February, and March, spring-tooth cultivated in April, and spring-toothed, sown with disc drill and harrowed during the first, second and fourth weeks in May. All cultivations were given after rain had fallen.

The order of sowing varieties was Ranee, Currawa, Federation, and Mac's White. Seed sown 52 lb. per acre; superphosphate, 101 lb. per acre.

The noteworthy features in the preparation of this land for crop are the early fallowing and harrowing (June), and the early cultivation given in July. It is quite evident that these points have been a big factor in the success of the crop. Such early working is always recognised as being advantageous, and this was particularly the case in the season under review, when lack of spring rains rendered it almost impossible to work the fallow later in the season. By having the fallow worked early it was possible to rely on the harrows to give a quick and cheap working to re-create a surface mulch after such light rains as were received during the spring and summer.

It is worthy of note, in respect to the varieties grown and their order of sowing, that Ranee is a fairly early maturing wheat, and might with advantage have been sown after the Currawa and Federation varieties.

Mr. C. H. Westblade's showed 50 acres each of Yandilla King and Currawa. This was a nice crop, fairly even and clean, but contained a high proportion of strangers in both varieties. Some flag smut was present, also some take-all, particularly in the grey, limey patches of soil. On such soil the crops are this year generally light and more affected by disease than on the other soils. The Yandilla King was noticeably "tipped."

Cultivation.—Mouldboard ploughed July-August to a depth of 3 inches, and harrowed September, part spring-tooth cultivated early in November, sown with combine April and May; seed 50 lb., and superphosphate 60 lb. per acre.

Mr. C. Cooper's entry was of Currawa and Wannon varieties. The greater part of this was a nice, regular, clean crop, but was reduced by a lighter portion. The explanation given by Mr. Cooper of the difference in the crop was that the poorer section was sown after receiving only one cultivation in April. The drilling was done some time after cultivation, when the charlock had obtained a fresh hold and the soil had dried out considerably. The remainder of the paddock was cultivated a second time and then drilled in good order.

Points were lost on account of the high percentage of strangers present in the section of Currawa, for weeds present in the early sown section of the crop, and for the presence of a small amount of flag smut, ball smut, and take-all.

The preparation of Mr. Cooper's fallow was as follows:—Mouldboard ploughed 5 inches in July and August, spring-tooth cultivated October, part spring-toothed April and May, and sown with disc drill, the remainder spring-toothed again and then drilled.

Mr. R. Wharton's crop was very heavy in patches, but was reduced by light areas of grey soil and the presence of barley, charlock, ball smut and take-all. Mr. Wohlers also lost considerably through the presence of ball smut, flag smut, take-all, and a large percentage of strangers.

Table of Awards.

Aggregate for Best 100 Acres of Fallow and Crop grown on the Fallow.

Competitor.	Yield.	Trueness to Type.	Absence of Weeds.	Absence of Disease.	Evenness.	Total Crop.	Total Fallow.	Aggregate.
Possible points ..	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
E. G. Elliott ..	35	17	14	14	14	94	82	176
C. H. Westblade	27	11	13	13	12	76	78	154
C. Cooper ..	26	15	11	12	11	75	79	154
R. Wharton ..	24	16	10	9	10	69	79	148
C. Wohlers ..	21	10	10	6	9	56	76	132

Note.—The points allotted for yield do not necessarily indicate the estimated yield in bushels per acre.

BEULAH CROP AND FALLOW COMPETITION, 1926.

Report of Judge, P. Ryan, B.Agr.Sc., Inspector of Agriculture.

In contrast to many competitions where the main feature is often the outstanding excellence of one or two crops, the Beulah competition was remarkable for the high general average of the crops shown. One of the purposes of these competitions is to standardize, as far as is practicable and desirable, the farming methods in the district—in other words, to prevail on the general body of farmers to adopt the methods which have enabled the best farmers to secure the most satisfactory crops. Judging by the even standard of the competition crops the Beulah Society is well on the way to achieving this—one of the aims of the competition.

The season opened very favorably, and there was every prospect of record crops, but the dry spell experienced in September—when less than half the average precipitation for this month was received—made just the difference between good crops and bumper crops.

A pleasing feature was the comparative absence of disease throughout the crops of the district.

Penny has become so popular around Beulah as to be regarded as the standard wheat of the district, and this year it certainly seemed to justify the growers' confidence in it.

The average rate of seeding for the district was 81 lb. of seed and 100 lb. of super per acre, and there were few wide divergences from these figures, although there is a growing tendency to increase the application of superphosphate to 1¼ cwt. per acre.

There were fifteen entries in the Open Crop Competition, and Mr. A. G. Couzner gained first prize with a very fine crop of Penny. This was well headed, exceptionally even, and free from disease and weeds.

Messrs. Bodey Brothers were a very close second with a nice crop of Daphne wheat.

Open Crop Competition.

Best 100 Acres of Wheat.

Competitor.	Yield.	Type.	Absence of Weeds.	Absence of Disease.	Evenness.	Total.
Maximum Points	**35**	**20**	**15**	**15**	**15**	**100**
A. G. Couzner	30	19	15	15	15	94
Bodey Bros.	30	19	15	14	15	93
F. Hofmaier	29	19	14	14	14	90
N. C. Hofmaier	28	18	14	13	14	87
W. J. Collins	27	18	13	14	14	86
V. P. Smith	29	17	12	14	14	86
F. Gniel	26	16	14	14	14	84
W. J. Collins	26	18	12	14	14	84
F. A. Wardle	26	18	11	14	13	82
G. Murray & Son	24	18	13	12	14	81
J. G. Millard	24	18	12	13	14	81
J. R. Kennedy	25	17	13	12	13	80
J. Walsgott	26	16	13	13	12	80
J. Walsgott	24	17	14	13	11	79
J. Walsgott	24	10	13	12	11	70

The land on which Mr. A. G. Couzner's winning crop was grown was fallowed with the scarifier in March, scarified in July and harrowed. Cultivated with combine in August, scarified in September, and harrowed twice before harvest. Harrowed in April, scarified in May, and sown with combine at the end of May with 90 lb. of seed and 120 lb. of super. per acre. The seed was pickled with formalin.

Bodey Bros. summer fallowed their land in March with the scarifier, ploughed it in July, and worked it three times before harvest. It was cultivated with the combine in April. Eighty lb. of super. per acre were sown before seeding to germinate the weeds, which were destroyed by a cultivation, and the crop was sown early in June with 80 lb. of seed and an additional 30 lb. of superphosphate per acre. The seed was pickled with formalin.

Crop and Fallow Competition.

In the Crop and Fallow Competition in which the prize is awarded for highest aggregate of points for 100 acres of fallow in 1925, and the crop grown on it in 1926, first place was gained by Mr. N. C. Hofmaier with a total of 183 points—96 points for fallow and 87 for the crop. Messrs. Bodey Bros. and Mr. W. J. Collins were equal for second place with an aggregate of 178 points.

100 Acres of Wheat Grown on Last Year's Fallow (Combined).

—	Yield.	Type.	Absence of Weeds.	Absence of Disease.	Evenness.	Total.	Fallow.	Total.
Maximum Points ..	**35**	**20**	**15**	**15**	**15**	**100**	**100**	**200**
N. C. Hofmaier ..	28	18	14	13	14	87	96	183
Bodey Bros. ..	27	19	14	14	13	87	91	178
W. J. Collins ..	26	18	12	14	14	84	94	178
F. Hofmaier ..	29	19	14	14	14	90	87	177
F. Wardle	26	18	11	14	13	82	92	174
J. R. Kennedy ..	25	17	13	12	13	80	91	171
Holdsworth Bros. ..	28	18	13	14	13	86	85	171
D. Mason	27	19	12	13	13	84	86	170
A. G. Couzner ..	25	18	12	12	13	80	89	169
F. Hovey	22	19	12	14	12	79	90	169
F. Gniel	25	15	13	14	13	80	87	167
G. W. Cook	21	18	12	12	13	76	88	164
Mason Bros. ..	26	15	13	14	12	80	84	164
A. T. Couzner ..	24	17	12	12	13	78	85	163

The fallows in this competition were judged in 1925 by Mr. J. E. Harrison, B.Ag.Sc., and details of the cultivation of fallows are contained in his report. (See this *Journal* for February, 1926.)

Mr. Hofmaier's crop of Penny was sown with the combine at the end of May at the rate of 80 lb. of seed and 120 lb. of super. The seed was pickled with copper carbonate.

Messrs. Bodey Brothers' crop of Wannon was sown early in June with the combine at the rate of 80 lb. of seed and 110 lb. of super. per acre. The seed was pickled with formalin.

Mr. W. J. Collins' crop of Penny was shown at the rate of 75 lb. of seed and 90 lb. of super. per acre. The seed was pickled with formalin.

Fallow Competition.

The fallows on the whole gave evidence of careful preparation, although in many instances the moisture content was lower than was expected. In some cases there was discovered under the mulch a hard cementy crust of a few inches which had to be penetrated before one reached the moisture-laden soil. This, of course, is evidence of the fact that the mulch was not doing its work of preventing evaporation. In most cases this was due to the mulch being of insufficient depth.

Results.

Best 100 Acres of Fallow.

——	Moisture.	Mulch.	Weeds.	Cultivation.	Total.
Maximum Points ..	**25**	**25**	**25**	**25**	**100**
Sanders Bros.	22	24	25	24	95
F. Hofmaier	22	23	25	24	94
Holdsworth Bros. ..	21	23	24	23	91
W. Gniel	20	22	23	25	90
A. T. Couzner	20	22	24	24	90
H. C. Lehmann ..	20	21	24	23	88
J. Walsgott	20	22	23	22	87
F. J. Lambert	20	20	23	24	87
Murray & Son	20	21	23	23	87
J. R. Kennedy	20	20	20	24	84
L. Shannon	20	19	22	23	84

Messrs. Sanders' fallow was scarified in February, cultivated with the combine in April, at the end of June, the end of July, and in September.

Mr. F. J. Hofmaier ploughed his land 3½ inches deep early in May with a skim-mouldboard plough, cultivated it late in June, harrowed it immediately after, and cultivated three times in July and August.

Messrs. Holdsworth's fallow was scarified in March. Ploughed at the end of June, harrowed immediately, combined in August, harrowed again, combined in September. Portion was then harrowed, but part where the soil was higher was left unharrowed to prevent drift.

The work of judging was greatly facilitated by the careful way in which each day's itinerary had been mapped out by the Secretary (Mr. Williams), and I desire to express my thanks to him and the members of the committee for the courtesy extended to me during my stay in the district.

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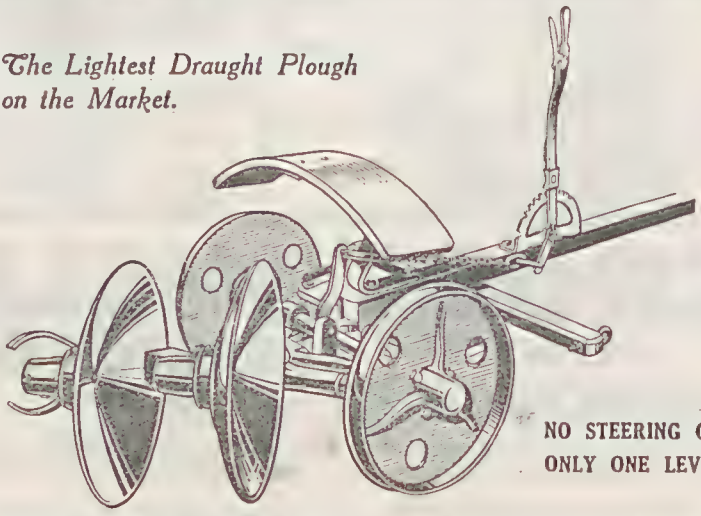

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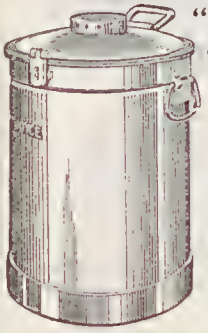

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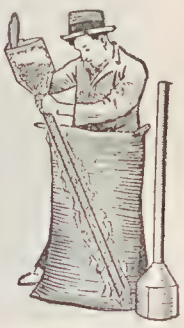

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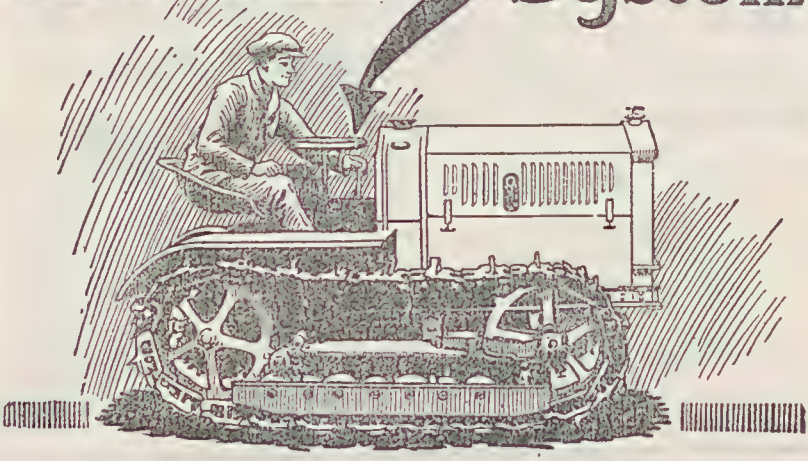

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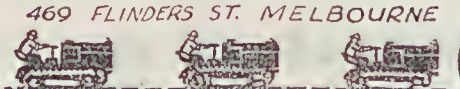

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No. 1—From Single Tested Hens with scores of 256 to 284 mated to Cockerels bred from Hens with scores of 272 to 313 eggs.

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DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

The Department has now completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter *fat* yielded. Thus a calf from a cow with a 400 lb. butter fat record is sold for 20 guineas, one from a 300 lb. butter fat cow for 15 guineas, and so on. Bull Calves *ex* heifers on their first calf are sold for a set price of 10 guineas.

(For Record of Yields of dams see Red Poll Herd Book.)

SIRES IN USE:

VICTORIA VOLCANO (322 A.)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Tonga (253 A.) by Honingham Archbishop (imp.) 9702 (48 A.A.).

Tonga's butter fat yields for 6 successive lactation periods are as follow:—1916, 341 lb.; 1917, 396 lb.; 1918, 419 lb.; 1919, 479 lb.; 1920, 428 lb.; 1921, 562 lb.

BELLIGERENT (Imported) 11096 (8 A.A.)

Dam's Record (1st milking) 7144 lb. milk.

Dam's Dam's	,,	14533 lb. milk	...	4	years	average	12871 lb. milk.
Sire's Dam's	,,	10370 ,,	...	7	,,	,,	9354 ,,
Sire's D. Dam's	,,	9510 ,,	...	12	,,	,,	8033 ,,
G. Sire's D. Dam's	,,	10215 ,,	...	7	,,	,,	9386 ,,
G.G. Sire's D. Dam's	,,	12565 ,,	...	10	,,	,,	8853 ,,
G.G.G. Sire's D. Dam's	,,	10088 ,,	...	2	,,	,,	9754 ,,

BIT O' 'BACCA (Vol. 3)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Nictitana (311 B.) by Nicotine (69 A.A.).

Nictitana's butter fat records for 6 successive lactation periods are as follow:—1918, 450 lb.; 1919, 396 lb.; 1920, 393 lb.; 1921, 465 lb.; 1922, 524 lb.; 1923, 536 lb.

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

Application for purchase to

Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.

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